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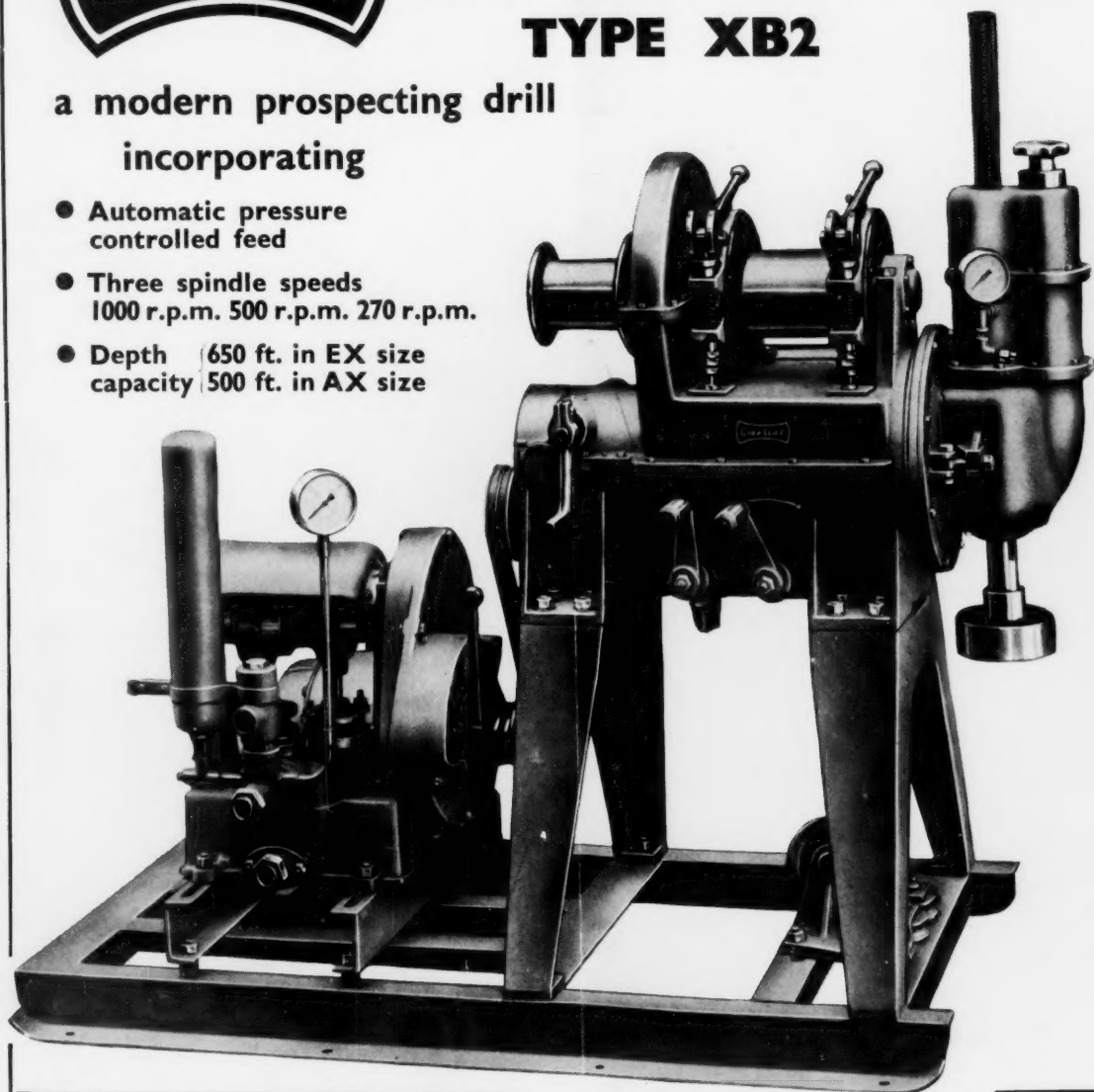
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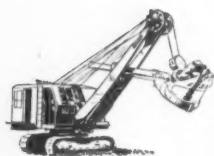
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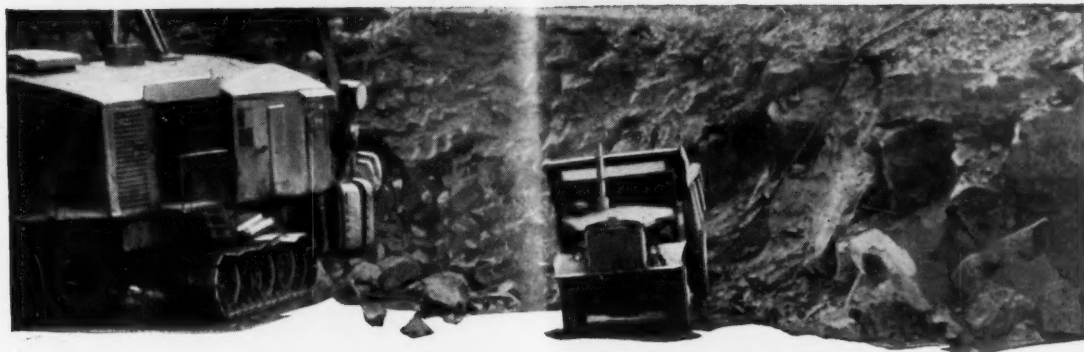
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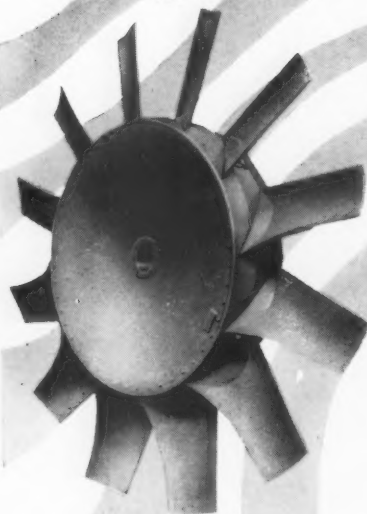
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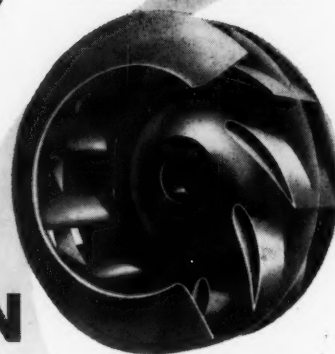


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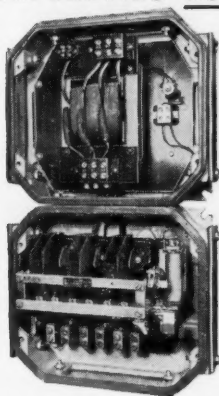
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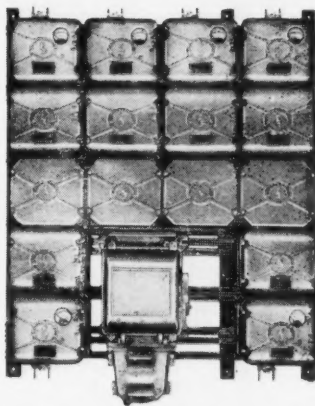
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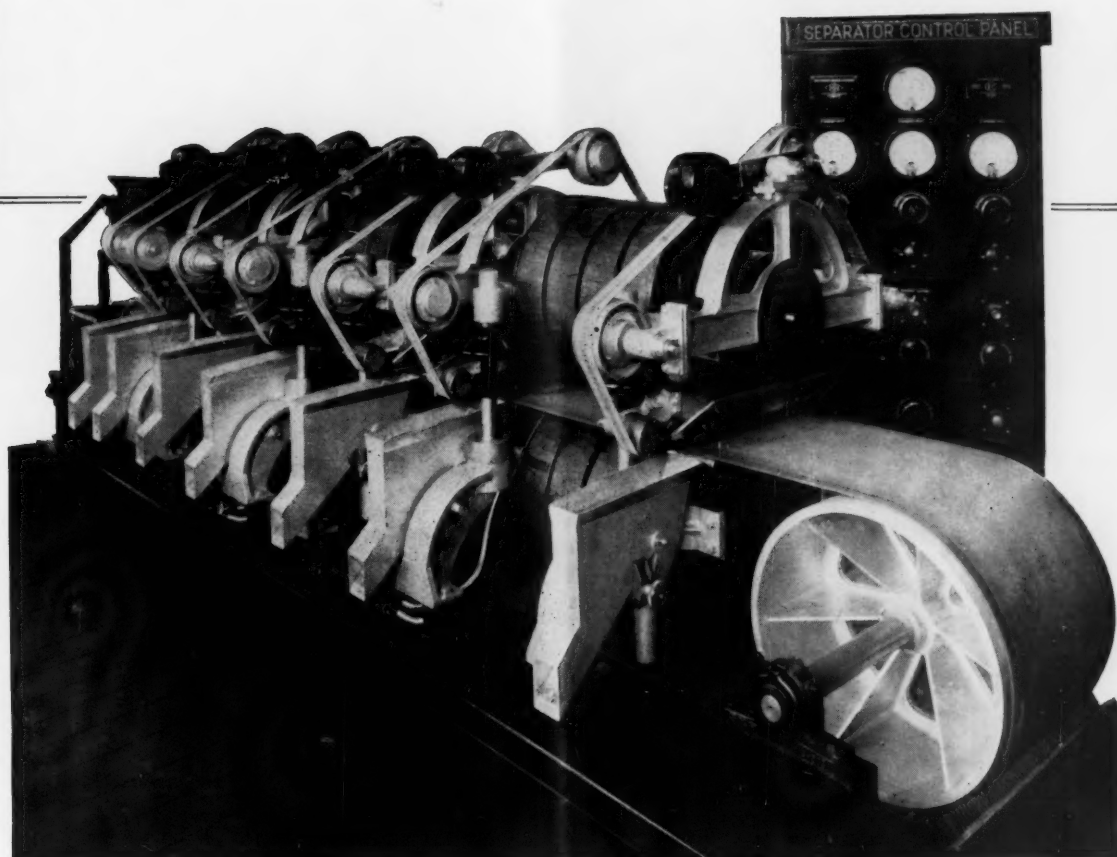
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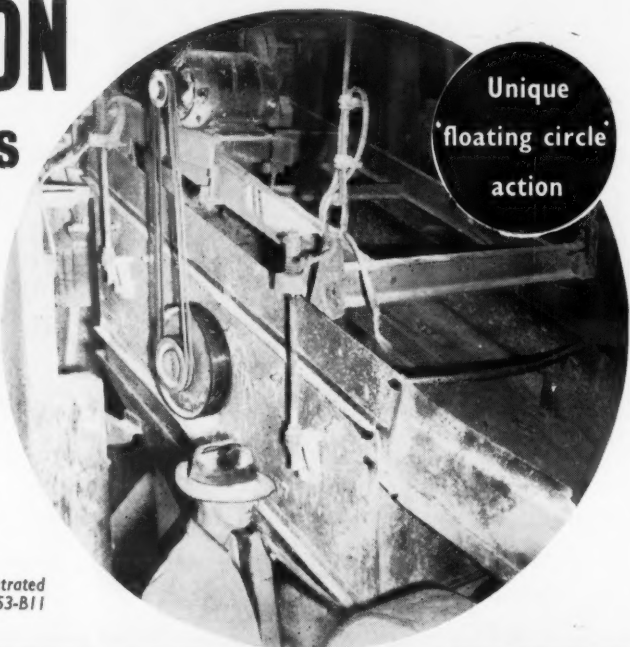
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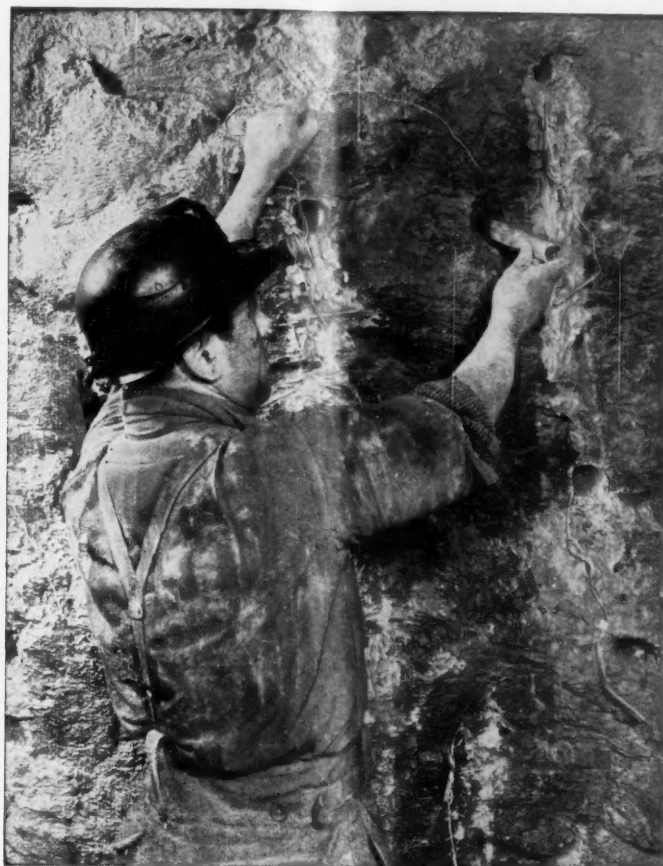
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The Mining Journal

Established 1835

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NOTES AND COMMENTS

Mr. Strydom—The Union's New Pilot

After six weeks of political analysis, a great deal of speculation, and no little amount of wishful thinking as to who would lead the Nationalist Party in South Africa, it was announced on Tuesday of this week that the successful candidate was Mr. Johannes Gerhardus Strydom. The appointment of the former Minister of Lands as Dr. Malan's successor followed a one-and-a-half-hour Nationalist Party caucus meeting and the Governor General has invited him to form a government.

Reports from the Union since November 30 reflect the view that the choice of Mr. Strydom was almost a foregone conclusion. Yet like so many situations seen *ex post facto* acceptance of these advices without reservation is to dismiss as being of little account the possibility that Mr. Havenga might have gained the Nationalist Party leadership for the period remaining before the next general election. Admittedly, such a move would have been interpreted as no more than a gesture, a stop-gap, or as a means of preserving the outward forms of unity within the Party until the next general election when the Party leadership would indubitably have fallen to Mr. Strydom with the support of the Nationalist extremists. But, too, would have indicated that the extremists were not yet ready to embark on policies designed to put into practice the radical doctrines they have so long advocated. More than that, of course, to wait would have involved a careful explanation of their intentions from the hustings to an electorate which would also be under considerable pressure of public opinion from countries outside the Union.

That there were two alternative candidates before the Nationalist Party caucus meeting is, therefore, significant. It meant that in choosing Mr. Strydom there was a clear cut decision taken in favour of furthering *now* the extremist policies advocated in the Nationalist Party and also, that the support forthcoming for Mr. Strydom was sufficient to preclude any danger of the Party splitting.

What course and by what means Mr. Strydom in the months ahead will pursue the doctrines previously enunciated by his followers is impossible to foretell, but it is certain that any positive action taken to implement any one of the four chief political ambitions of the Nationalist Party will condition South Africa's outlook for many years

to come. In theory, the accession of Mr. Strydom to the post of Prime Minister of South Africa presages action on four fronts; the implementation of the Verwoerd-type apartheid, the disfranchisement of the coloured voter, the establishment of a South African Republic, and the acquisition of the High Commission Territories of Basutoland, Bechuanaland and Swaziland.

Any one of the first three issues is sufficiently controversial to split the nation, while any move to acquire unilaterally the three High Commission Territories is bound to bring about a clash within the Commonwealth. On the plane of international law it is arguable that the first three issues could be adjudged as coming within the exclusive jurisdiction of the Union of South Africa. But even so, the fact that it would be necessary to subordinate the judiciary to the executive to disfranchise the coloured voter and to re-write parts of the Constitution to effect the full implementation of their particular version of apartheid would unhesitatingly bring about strained relationships within the Commonwealth—if, indeed, when setting the stage for the special referendum to elect for Republic status it was not also agreed to leave the Commonwealth. Should there be any doubts as to the required majority of votes to obtain a mandate for the foregoing policies, Mr. Strydom's weapon to override the opposition is ready—that of enlarging the franchise to include those of 18 years of age thereby bringing in the younger generation which has been fed on the glory of Arikanderdom from the cradle to the University.

However, it is one thing to state a policy and another to implement it and the age old conflict of reconciling the politically desirable with the politically practical has generally led to important modifications being made to the original doctrine. It is hoped that this will prove to be the case. Obviously, the situation will call for compromise solutions and if these are not forthcoming the future promises a series of clashes both within South Africa and within the Commonwealth. This is not to say that there are any doubts about Mr. Strydom's sincerity and integrity but rather does it point to his unwavering devotion to the ideals expounded by the Fathers of the Boer Republics and to his eagerness to grasp the nettles with both hands.

In may ways, the fact that the South African mining industry is more prosperous than it has been for several

years will strengthen Mr. Strydom's hand in that the resulting prosperity will enable the country to rely less on outside support and to diminish the need for compromise. It is too early to speculate on whether Mr. Strydom contemplates making any changes in the sterling dollar pool arrangements or in the gold agreement with this country, but should these points also become issues to be reckoned with in the months or years ahead it will be interesting to observe how long the Nationalist Party can survive in a friendless world.

Their apartheid policy if implemented will be viewed with as little favour in the United States as in the Commonwealth. But in those parts of Africa where a native problem of any size and complex exists such as in the Central African Federation its attempted implementation may lead to a stiffening in attitude of not only the Europeans towards the natives but also the reverse which, coming as it would do at a very crucial stage in the African labour negotiations on the Copperbelt, might have serious repercussions.

Optimistic Outlook for Iron and Steel

The continuous expansion of British iron and steel production throughout the post-war decade has tended to divert attention from movements in a contrary direction elsewhere. After reaching record heights in 1952, European steel production fell into a state of decline last year, and in the U.S. the steel slump has been almost catastrophic. Now the tides of recovery are sweeping across the European and American continents. The quarterly bulletin of the E.C.E. records that the annual rate of crude steel production during the third quarter of this year was around the 1952 record annual level in Belgium, France and Luxembourg whilst elsewhere in Western Europe new records were being established.

Last to experience the impulse of the trade winds, American steel is also staging a rapid recovery. Production has risen to the highest point since February last. But even a gain of 20 per cent since mid-August still leaves the weekly steel output well below the 2,000,000 tons plus of ingots that were being turned out a year ago. U.S. steel men are tempering their forecasts with caution, but it is believed that the long sought turning point has been reached at last.

Whatever be the position elsewhere, British steel is ending the year on a wave of unqualified optimism. A rise of ten per cent in the volume of exports bespeaks a strong competitive position in world markets, but it is the ever increasing extent of home demand which has enabled the industry to increase production by very nearly a million tons this year, and provides the steel makers with the impetus to aim at a further increase of 750,000 tons in the year ahead.

It is doubted whether this rate of expansion will suffice. The word shortage has, in fact, been restored to the steel users' vocabulary. Only the big build up of stocks during the summer months has concealed the deficiency in the current output of pig iron, a deficiency which has impelled the British Iron and Steel Corporation to make big purchases of Austrian and Russian pig iron. Imports of semi-finished steel of European manufacture will have to be resumed because of the inability of the British steel makers to fully satisfy the swollen demand. Marginal tonnages of steel sections, sheet and strip have also been bought from Continental suppliers and at an extra cost of about £11 per ton, sanction has been given for very considerable purchases of American tin plate on which the Government has waived the 25 per cent import duty. These, of course, are all more or less temporary expedients, but it is not expected that tin plate production can be raised to the level of domestic requirements until mid-1956.

Reduction of Minute Impurities in Metals

During approximately the last four decades there have been many instances in which minute amounts of elements added to metals and alloys have produced improvements in purity rating. As a result of these largely experimental treatments, almost limitless boundaries can now be envisaged in the field of the metallurgy of minute additions.

This was the theme of an address delivered last year before the American Society for Testing Materials by Dr. Jerome Strauss, vice-president of the Vanadium Corporation, and published in *The Mining Journal* of August 7, 1953. The view is endorsed by Dr. B. W. Gonser, of the Battelle Memorial Institution, one of the leading metallurgists in the United States, who sees the drive towards higher purity in metals as "a new frontier for metals progress." Dr. Gonser has reported that scientists probing more deeply into the effects on metals of extremely small or trace amounts of impurities in the hope of finding ways to create new materials, make hitherto unusable metals applicable to treatment, extend markets for commonplace metals, and open up avenues for further engineering advances.

That progress has been made towards this goal is shown by the fact that purer metals have already brought new and better alloys which have been used in making car valve springs, ball bearings, jet turbine buckets, nuclear power plants, tool steels, transistors, vacuum tubes, and watch springs. Indeed, the majority metals have been refined to a state of sufficient purity to determine their principal properties. Purity, in this sense, means about 99.9 per cent purity, and Dr. Gonser describes the new frontier in metals as that remaining 0.1 per cent before absolute purity is achieved.

Writing in the current issue of the Cleveland Federal Reserve Bank's *Monthly Business Review*, he states that trace impurities may involve any element in the periodic table. It is not only necessary to consider the common impurities such as carbon, manganese, phosphorus, sulphur, and silicon, but also those normally in the gaseous state, such as oxygen, nitrogen, and hydrogen, and the rarer metallic elements cerium, lanthanum, and thorium, for example.

Dr. Gonser cites numerous examples where strict control of trace impurities in metals has led, or might lead, to new or improved uses. These examples include the commonplace metals such as iron, zinc, and aluminium, as well as less common ones like titanium, zirconium, vanadium, germanium, chromium, and molybdenum. A classic example is titanium which was brittle and almost useless until a practical method was found to remove the oxygen and nitrogen below the last tenth of a per cent. Chromium and vanadium, usually regarded as brittle, are actually ductile in the state of purity or near-purity.

Other examples are of specific interest. In the making of transistors, germanium and other semi-conductor materials must be refined to an extremely pure state. Control of electrical properties in the transistor is then obtained by adding to the semi-conductor material a very tiny, measured amount of arsenic, indium, or gallium. Other studies show that iron containing less than fifteen parts of impurities for every million parts of iron is unusually soft, workable, and corrosion resistant.

Enough has been learned about the effects of trace impurities on metals to convince scientists that the full potentialities of metals are still to be realized. Dr. Gonser concluded his article by pointing out that as more knowledge is acquired about trace impurities and as better methods are developed for removing and controlling them, expanded versatility for both old and new metals should result.

Developments in the E. African Mining Industry

Like so many other remote mining areas, East Africa is well served by air transport. Apart from Williamson Diamonds Ltd. which operates its own fleet of aircraft, nearly all the mines in the area are linked by an efficient shuttle service. Our East African correspondent in the following article describes the air facilities available before discussing the construction and development programmes in hand in the territory.

The opening of the new airport at Dar es Salaam last month marks a further stage in the development of the air services of East Africa. Mining companies are particularly well supplied with air services—in fact all the large mines are on scheduled routes, except Williamson Diamonds Ltd. which company runs its own air fleet.

AIR SERVICES TO MINES

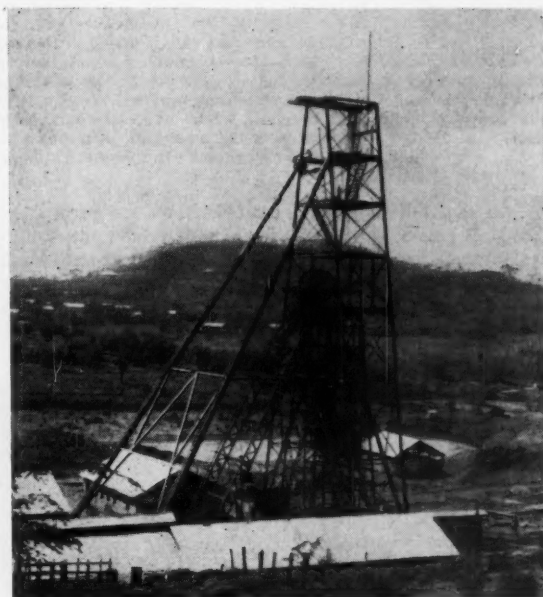
In Tanganyika, the Mpanda lead mine has a weekly service each way to Dar es Salaam and to Nairobi; the Geita gold mine is a request stop on the "round the lake" service which operates twice a week in both directions; and the Musoma Goldfield and Mbeya (for the Panda Hill pyrochlore deposit and Lupa Goldfield) are visited several times weekly by two different services.

In Kenya the "round the lake" service also visits the Macalder copper mine four times weekly. In Uganda there is a tri-weekly service connecting the Kilembe copper mine with Entebbe and Nairobi, while the pyrochlore deposits at Sukulu are visited twice weekly in each direction by a service between Nairobi and Entebbe.

The only mines which cannot be visited by air are those in the tin, tungsten and columbite-tantalite field in the Kigesi and Ankole Districts of Uganda.

The Williamson diamond mine has quite a fleet of aircraft—a Dakota, two Doves and two small planes belonging to the Company's Flying Club.

The present time is one of construction and development in East Africa. At Williamsons the erection of the main 7,200-tons-a-day plant is approaching completion; the six cu. yd. walking dragline excavator is ready, and the travel-



The new headgear on Main Shaft, Mpanda, built around the old shaft which is still in commission

ling hopper-crusher unit and the conveyor belt system are under construction. The final recovery section, which includes the latest greasebelt and electrostatic techniques, will, it is hoped, come into operation together with the rest of the plant early in the second quarter of 1955.

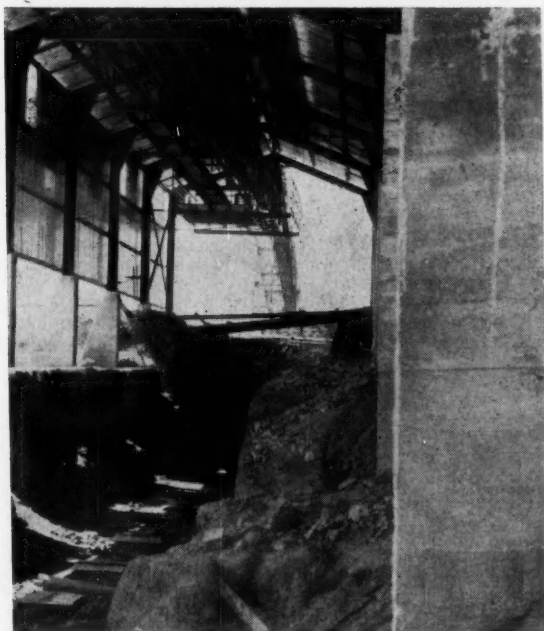
The current programme of expansion is costing Dr. Williamson about £3,500,000, all of which has been found from revenue. During 1954, by working rich ground he has doubled his output of diamonds. When the new plant comes into operation, however, no further spectacular increase in production is to be anticipated because very much lower-grade ground will then be rendered workable.

CONSTRUCTION AT MPANDA

At the Mpanda lead mine the new 1,000-ton-a-day plant is approaching completion, and full production is expected by the middle of 1955. To complete their programme the Company, Uruwira Minerals Ltd., have arranged a loan of £350,000 which has been guaranteed by the Government of Tanganyika against a charge over the Company's property and assets held jointly by the Governments of Tanganyika and the U.S.A.

During the erection of the new 120 ft. headgear, hoisting proceeded uninterrupted with the old one. At the moment the output of the pilot plant is temporarily reduced while the upper portion of the main shaft is being relined and re-equipped.

On the Macalder copper mine in Kenya, the treatment of the ore, which has always been a headache, a new method has now been designed including a fluo-solid roaster. Uganda's Kilembe Mine is to use a similar method. The final concentrates from both mines will be smelted electrically at Jinja, using power from the new Owen Falls dam.



The new 3,000 ton stock bin at Mpanda lead mine

S.A. MINING TRENDS—II

Current Mining Practice at Harmony Gold Mining Company—I

Harmony Gold Mining Company, the rich Orange Free State gold/uranium producer in the Central Mining Group, was registered in South Africa in August, 1950, and came into production in September, 1954. In the following article, which has been specially contributed to *The Mining Journal* by a South African correspondent, the factors which determined the siting of the two shafts already sunk on the property and also the positioning of the proposed third shaft are discussed before a description is given of the company's lease area and current mining practice. In next week's issue the second and concluding part of this article will deal with Harmony's reduction and uranium plants. The photographs in both portions are published with grateful acknowledgment to Mr. Derrick A. Bridge. This article is the second of eight which will describe current mining practice in at least one mine in each of the chief South African groups. In last week's issue West Driefontein was discussed in the above context.

Two shafts have already been sunk on the property—the No. 3 and the Ventilation. Both are in the south-eastern section of the mine, the distance separating them being 4,300 ft. with the No. 3 shaft to the west of the Ventilation. The main considerations in the siting of these two shafts were the relatively good sinking ground; the relatively shallow depth of the main horizon—the Basal Reef; and, the relatively good mining conditions which favoured a rapid development programme and the preparation of a sufficient number of stope faces to maintain initial milling capacity while development was being advanced.

Another important factor determining the siting of the shafts was the occurrence of an extensive dolerite sill at the location of the No. 3 Shaft. This sill provided good ground for the heavy-bearing foundations of the shaft headframe, the winding house and equipment, the compressor house, the reduction and uranium plants, and the workshops. About 3,500 ft. to the northeast of the No. 3 Shaft, the mine offices have been built on a sandstone lens. At the proposed site of the projected No. 2 Shaft, about 5,500 ft. to the northwest of the No. 3 Shaft, another dolerite sill of adequate dimensions occurs, and good sinking ground was indicated by borehole LR 9. The importance of these sills

and lenses lies in their stable surface and sub-surface conditions—which contrasts with the unstable or heaving characteristic of the surface and sub-surface alluvium of the Karroo formations over most of the Orange Free State gold field.

The Ventilation Shaft is circular, 24 ft. dia., and concrete-lined. For the first few years of operations it will be used as an upcast hoisting unit with a normal capacity of about 20,000 tons a month and eventually, it will be stripped and equipped with exhaust fans on the surface. It has been connected with No. 3 Shaft on the 6th Level. The cutting of the main winze from the Ventilation Shaft has been suspended at a distance on dip of about 1,800 ft. from the No. 3 Shaft, and the remaining footage is being cut from the No. 3 Shaft end. Completed to a final depth of 4,729 ft., the Ventilation Shaft has three compartments: one service and two hoisting

equipped with 5-ton skips which are interchangeable with cages. Rope guides are used.

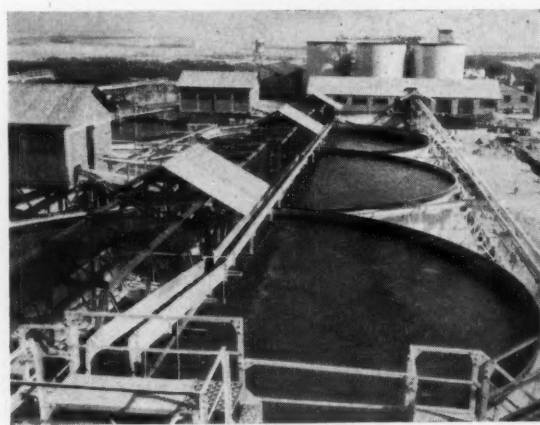
The No. 3 Shaft is downcast, circular 24 ft. dia., and has been sunk to its final depth of 5,380 ft. It has four compartments—two equipped with 3-deck cages, and two with 10-ton skips interchangeable with cages. Two winders each of 3,000 h.p. and with a hoisting speed of 2,160 ft. a minute



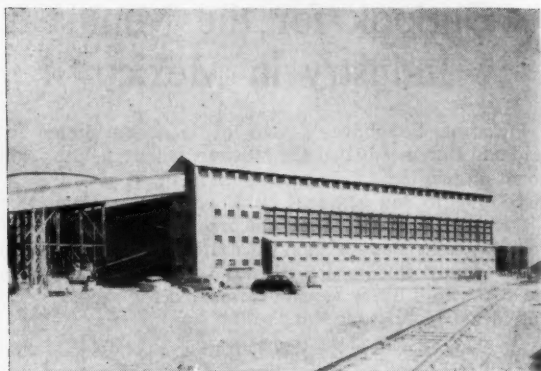
The shaft buildings and reduction plant with the native hostel in foreground



The clarifier tanks



The thickener tanks



The mill building

have been installed at right-angles to each other. The hoisting capacity is about 70,000 tons a month. The projected No. 2 Shaft will be located at the site of borehole LR 9 and will also be a circular, vertical shaft. The sinking methods to be applied will doubtless incorporate concurrent sinking, lining and equipping, and use will probably be made of an air-operated cactus-type grab suspended from a multi-deck sinking stage.

DEVELOPMENT OF THE AREA

The lease area was explored by 10 boreholes, in nine of which the Basal Reef was intersected with an average of 805 in.-dwt., equivalent to 20.4 dwt. over a channel width of 39.5 in. From the start of reef development to September 30, 1954, 11,010 ft. had been sampled of which 94.1 per cent were payable averaging 640 in.-dwt., equivalent to 14.2 dwt. over a channel width of 45 in. The drilling had indicated the persistence of a wide reef throughout the greater extent of the lease area, and development operations carried out during the June and September quarters of this year showed an average channel width of 68 and 60 in.

Another favourable geological circumstance previously indicated by drilling (and confirmed in the limited area so far developed) was the absence of the troublesome khaki shale over a large portion of the lease area. So far as is known, the khaki shale is present in the north-western portion of the lease area. At its maximum it is about 3 ft. thick, thins out to the east and south, and it lies at from a few inches to a few feet above the Basal Reef. Mining

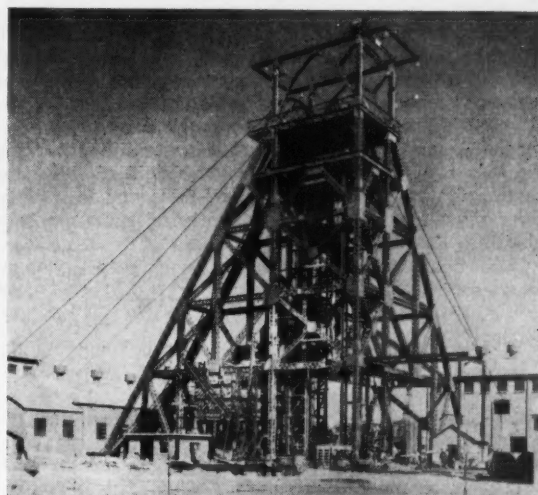


Conveyors feeding the stockpile

operations are not likely to encounter the khaki shale area for some years to come. The area where current development work is being undertaken is relatively free from faults and dykes, and therefore from water-bearing fissures of a serious nature. Over the next few years, stoping is expected to be relatively free from these mining impediments. In two headings northeast of the Ventilation Shaft and in the winze, operations have been retarded by water-bearing fissures but the overall effect has not been serious. The importance attached to ventilation requirements is reflected in the intention to cut at least three level connections between the two shafts as well as completing the winze.

ADOPTION OF LONGWALL STOPING

The orebody is being opened up from reef drives advanced on the various levels, which are at vertical intervals of 230 ft. Subsequently, the intermediate reef drives are cut at intervals of 435 ft. on dip. Raises are cut from the reef drives on the various levels at strike intervals of about



The No. 3 shaft headgear with main hoists at 90 deg. to one another

800 ft. In addition, footwall haulages are advanced at regular intervals and crosscuts taken back under the raises. These crosscuts are connected with the latter by boxes or ore-passes. Longwall stoping is being adopted wherever possible to minimize the incidence of pressure bursts and to facilitate improved ventilation. The broken ore is scraped down to end-tipping cars in the reef drives and scatter-walls are formed from the excess ore. The scatter-walls are also scraped in rotation down to the cars which are loaded, trammed and the loads tipped into the raise boxes. From the footwall crosscuts the ore is hauled in 3½-ton Granby-type cars drawn by 10-ton overhead-line trolley locos through the footwall haulages to the shaft pass-system.

Blasting in the stopes is effected by means of standard gelignite detonated by normal fuses and, as available, igniter-cord. Jack-hammers and stope air-legs are used in drilling the blastholes. In the development ends, standard drag rounds are drilled by jackhammers mounted on air-legs. The broken rock is mechanically loaded into 3½-ton Granby-type cars hauled by diesel locos to the shaft pass-system.

Mine Training Scheme in Southern Rhodesia

A technical training school for mine apprentices is to be opened next year by the Cam and Motor mine at Gatooma, Southern Rhodesia. The new school will come into existence as a development of the mine's new staff training scheme and will be largely self-supporting. Apprentices will pay no fees but will pay for board, lodging and amenities, and will continue to receive wages while attending the school, according to recent information received from our Rhodesian correspondent.

The original purpose of the training scheme was to provide refresher courses for specialist technicians and to acquaint young men joining the mine from overseas with the background to their new environment before they began work. Subsequently the broader plan presented itself, namely that the scheme be thrown open to mine apprentices from the whole of Southern Rhodesia.

In its completed form the scheme has the support of the Chamber of Mines and the National Industrial Council for the mining industry. Indeed, the school will be operated under the aegis of the Council, which is providing material and financial support. It is pleasing to record that the scheme is receiving the enthusiastic acceptance of the Rhodesia Mine Workers Union through its representatives on the Council, while in addition it has been approved by the Ministry of Education. The latter body is providing the services of the Adviser in Technical Education to assist in the early stages of planning and in the selection of a suitable Instructor-in-Charge.

THE SCHEME IN DETAIL

In brief outline, the scheme is that buildings at the Cam and Motor mine are being adapted to provide a lecture room and a drawing office for instructional purposes, while simultaneously allowing living quarters for the students. Apprentices will be drawn from their particular mines for a period of approximately three months each year for each of the three or four years of their apprenticeship, and will not be called on during their year of military service. During the educational period the students will be engaged in full-time study to the extent of some 28 hours per week. The curriculum of study will embrace a wide range of technical subjects, which will be mechanical or electrical according to the trade followed by the individual.

If the experiment of inaugurating this scheme is successful it may well prove to be a revolutionary step in the training of artisan apprentices in the mining industry. Through the opportunities offered by the plan, apprentices will be better equipped to proceed to the higher posts of the industry in competition with city-trained apprentices. Complete assessment of the scheme's value is as yet a matter for the future, yet it may prove the means of obtaining for the mining industry an assured flow of good quality personnel who later will fill vacancies in the higher levels of practical engineering posts where decisions based on an understanding of the theoretical principles as well as practical applications are required. Equally important, perhaps, is the psychological aspect of the scheme which will enable the apprentices to take advantage of the technical education being held open to them.

The original intention was to launch the scheme in January, 1955, but as a result of unexpected delays it may not commence until a little later in the year.

Outlook for the Mining Industry in Mexico

President Eisenhower's veto of increased duties for lead and zinc means that the Mexican mining industry can count on markets for its production in the next two years. According to the National Bank of Foreign Commerce Mexican production of lead and zinc "is of great importance from the national and international point of view." Mine activity will be strengthened and domestic demands assured with a heavy volume earmarked for export, states our Mexican correspondent.

Mexico is second to the U.S. in lead production and holds seventh place in zinc production. Mexico has opened new markets for its lead production, aside from Great Britain which absorbs approximately 20 per cent. Belgium has increased its purchases ten times above the 1950 imports and Japan has also been an increasing market, according to the Bank report.

THE EXPORT PICTURE

Mexican exports of metals to Japan have, on the whole, shown a sharp drop in recent years. In 1937 fully 70.6 per cent of Mexico's exports to Japan comprised zinc and lead, but this proportion dropped to 52.8 per cent by 1951, and while figures for this year have not been released it is understood that metals now account for only a small part of exports to Japan.

The mining industry is interested in recapturing this market and has asked for official aid. Japan has stated recently that she may cut imports of all Mexican products further if the Republic continues to import a minimum amount of Japanese goods.

Mexico's petroleum industry is faced with curtailment of exploratory work for new fields as well as expansion of installations as a result of unprofitable operations. Mexican petrol is sold at the lowest price in the world—40 centavos for Mexolina and 50 centavos for super-Mexolina (\$.0320 and .04 c.) a litre.

An attempt to boost prices around 35 per cent in Tampico brought a protest strike by chauffeurs that paralyzed traffic for more than a week. Pemex insists that it must raise prices and the Federal authorities have given their approval, but public resistance is strong. There has been a slowdown of work by exploratory brigades and the entire refinery and progress programme of the government oil monopoly is perilled.

PRODUCTION PROSPECTS

From San Andres Tuxtla in Veracruz have come reports of a new strike of a rich gold, lead and silver vein in co-operative farm lands of the Gatemaco village. Surveyors, attempting to find a firm base for their theodolite, broke a rock projection and were excited by seeing traces of a brilliant metal. Analyzed by the Sterling laboratories in Mexico City, the analysis showed the rock rich in the three metals. Studies are now under way to ascertain best means of exploitation.

The Department of Economy has indicated Mexican mining production prospects for the current year: 220,000 tons of lead, 170,000 tons of zinc, 55,000 tons of refined metals, 60,000 tons of copper and 1,500 tons of silver. Taxes on this production will total 660,000,000 pesos (\$52,800,000), with a discount of approximately 60,000,000 pesos (\$4,800,000) in subsidies conceded by the Federal Government to small mining firms whose annual gross does not exceed 200,000 pesos (\$16,000).

Utah Research Centre for Metals Study

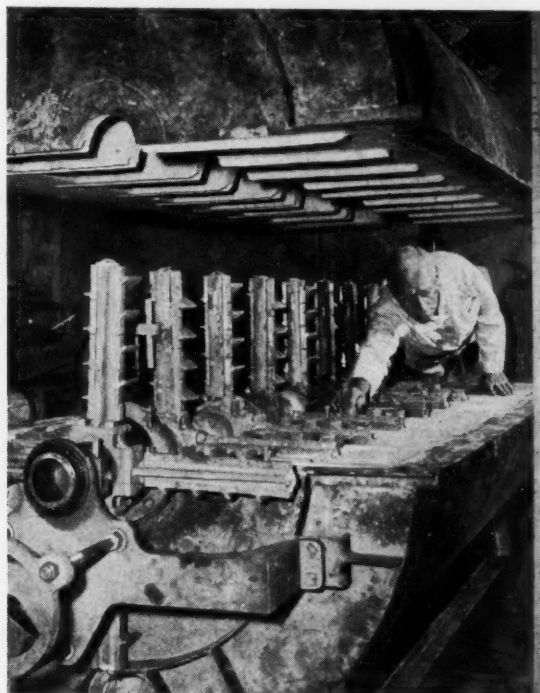
A new \$1,250,000 research centre to study metals mining, milling and refining operations, and to develop the results into commercial application, has been established by the Kennecott Copper Corporation at the University of Utah, Salt Lake City, United States.

Described by company officials as a well equipped laboratory of its kind, the new facility will research all types of metallurgical problems, conduct ore dressing research, investigate the concentration and recovery of metals by hydro-metallurgical processes, and conduct pyrometallurgical investigations using the most advanced roasting, sintering and furnace equipment. A primary research problem will be the development of new flotation reagents such as oils, xanthates and starches to improve recovery and grade of concentrates.

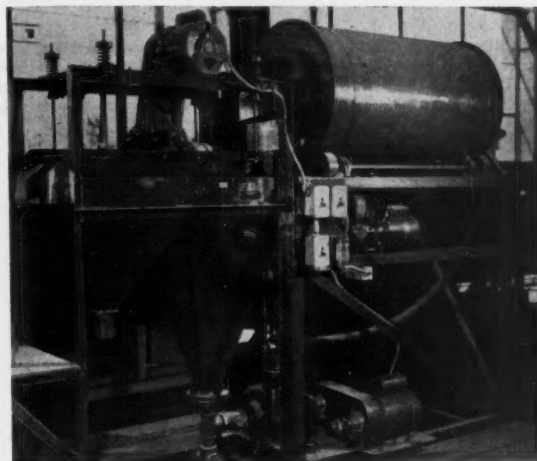
Apart from producing 45 per cent of the United States primary copper output and 25 per cent of the free world production, Kennecott Copper also is America's second largest producer of gold, the third largest silver producer, and the second largest producer of molybdenite in the world.

MODERN ENGINEERING INNOVATION

To prevent pilot plant vibration from affecting the sensitive laboratory apparatus, laboratory sections of the new three-storey research structure are separated from the plant installations by an expansion joint extending through the entire building. The effectiveness of this modern engineering innovation has been demonstrated by the fact that some of the centre's most delicate scales (gold and silver balances capable of weighing 1/500ths of a milligram, or two micrograms) are operated successfully only three feet away from the expansion joint, separating research areas from jarring movements of milling and other heavy equipment operations of the facility's pilot plant.



A multiple hearth roaster used primarily to change sulphide minerals to oxide as part of pyrometallurgy research



A complete heavy media sink-flood separator unit built on a small scale for pilot plant testing

Installations in the laboratories include an X-ray diffraction unit with fluoroscopic attachment, a 3.4 metre emission spectrophotometer, and an infra-red absorption spectrophotometer, a recording polarograph and a flame spectrophotometer for physical analysis. Other apparatus includes equipment for roasting sulphide concentrates at the rate of a ton a day and electric furnaces for smelting 25 to 500 lb. per charge. In addition to such equipment destined for studying the structure and composition of ores and metallurgical products, complete chemical laboratory facilities are provided.

FIVE-TON OVERHEAD CRANE

The plant has a 5-ton capacity overhead travelling crane, high and low pressure natural gas and compressed air, hot and cold soft water and cold hardwater, high pressure steam and a choice of 110 v., 220 v. single-phase and 220 v. 3-phase power available at easily accessible outlets. The pilot flotation mill is designed to handle 600 lb. of ore per hour.

Projects already under way at the research centre deal with improved recovery of copper and other metals by leaching processes. There are large quantities of low-grade waste material which accumulate as a result of the company's open pit mining methods. This low-grade material does not contain enough copper to justify milling, but nevertheless, it contains millions of pounds of the metal. A small amount of copper is recovered by the present leaching method, although it is believed that the method could be improved to provide greater yields.

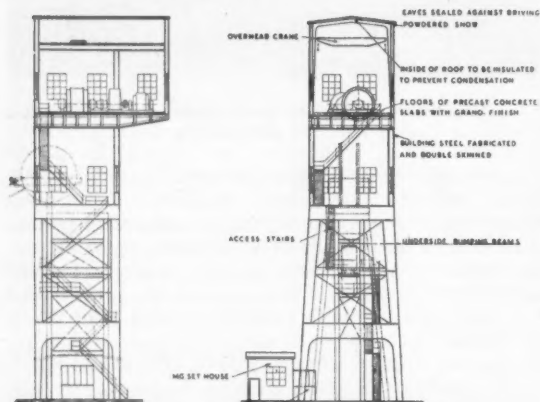
In addition to studies of better recovery of ores from present waste materials, other studies are under way which bear on flotation processes used in the company's mills. A factor limiting the percentage of copper recovered by the flotation process in the copper ores, is the inability to float efficiently the non-sulphide copper minerals. New flotation reagents are being investigated in an effort to solve this problem. A study is also being conducted on the feasibility of leaching the unrecovered copper from the tailings or residue from the flotation process. Another investigation is being made on the possibility of scouring the oxide minerals from the sulphide minerals so that the overall copper recovery can be improved.

WINDING—II

Modern Principles in Shaft Winding Practice

The following article is the conclusion of two instalments comprising the condensation of a paper by A. W. Kidd, B.Sc., M.I.Mech.E., M.I.E.E., M.I.Min.E., and H. M. Hughes, M.A., A.M.I.Mech.E., A.M.I.E.E., respectively divisional chief engineer and assistant to D.C.E. of the S.W. Division, N.C.B., which was presented at the general meeting of the South Wales Institute of Engineers on November 8, 1954. The first part of the article, which was published in last week's issue, discussed modern trends in the design and usage of winding equipment and ropes, while the portion appearing below takes the conclusions thus reached and considers their basic principles in relation to the design of all types of shaft equipment.

In many cases advantages in winding accrue from using only one conveyance with a balance weight in place of the other. Obviously only one pay load can be raised every two winds and to obtain equal output the pay load has to be doubled; accordingly, a single large cage is used of about twice the size of the alternative twin cages. There is no difficulty about this since the counterweight occupies little space in the shaft.



Tower design for a conversion project accommodating single cage and counterweight without deflecting pulleys. The existing headgear is contained on left

With skip winding, savings in capital outlay arise from having to make only one skip measuring and loading point and one discharge point at surface, while with cage winding simplification of track and of car handling results. In addition, it will frequently be found that shaft insets may be narrower and therefore cheaper for single conveyance winding and in some cases it will be possible to arrange a track across the shaft at each landing between the cage and counterweight. In many cases economies are also to be expected in the amount of shaft equipment required to guide a single conveyance and balance weight compared with two conveyances, while the cost of the conveyance and weight is likely to be less than that of two conveyances, though these may be smaller.

SKIPS AND CAGES

Skips of the conventional bottom-discharge type are well known and when operated against a counterweight can be designed to raise large outputs up very small shafts.

A difficulty with cage winding has always been to prevent the cars from jumping the cage scotches or stops and falling down or fouling the shaft. For this reason end guides have been adopted in many cases. The disadvantages are that end guides often give rise to a more complicated arrangement of buntons, involving more steel and more resistance to ventilation than side guides, and that, in the case of multi-level working, the end guides have to be cut at the landings. While it is possible to interlock the hinged part

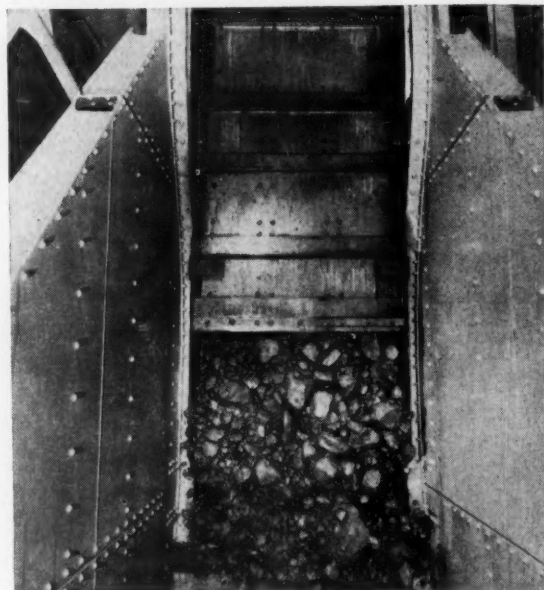
of the guide at a landing, it is nevertheless felt that these breaks in the continuity of a guide constitute a hazard which may result in a major shaft accident. In order to render side guides acceptable, therefore, a second line of defence to prevent cars inadvertently leaving the cage is required. Such a device may be provided by end gates.

THE WINDING ENGINE

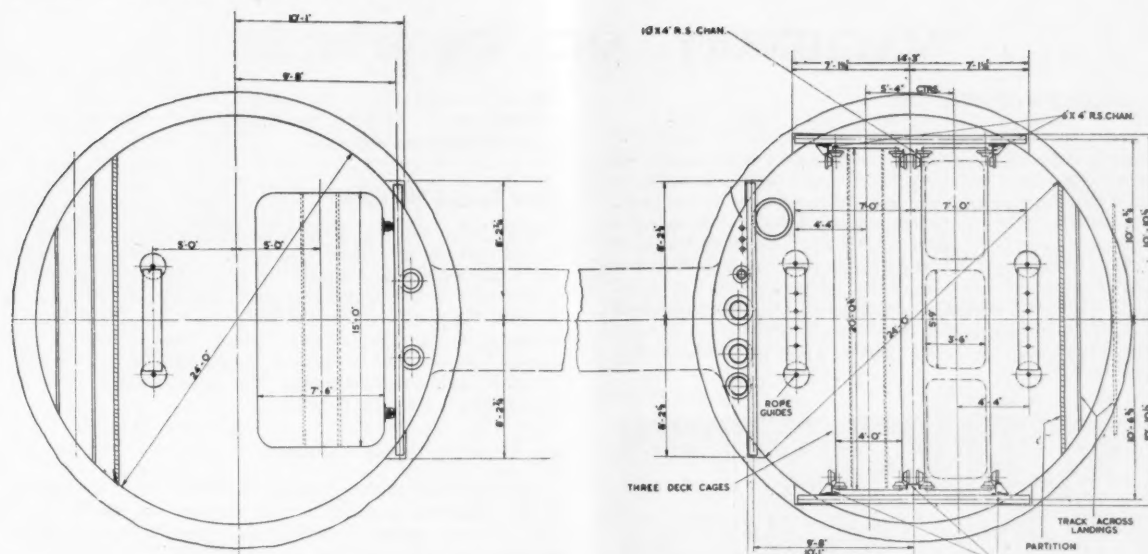
While automatic winding can be effected with an A.C. drive it is thought that generally on all except small winders, Ward-Leonard D.C. drives will give more nearly perfect control combined with simple and easily maintained equipment. The motor speed need only be limited by commutation requirements and the D.C. voltage may be as high as the motor designers can recommend. This may give upper figures of 750 and 1,500 respectively. With Ward-Leonard control it is not easy to see how an overwind can occur. Nevertheless, prudence dictates the provision of overwind distance and 30 ft., plus the overall length of the cage, may be taken as a reasonable figure.

The winder motor should incorporate the closed-loop system of control, with speed/load compensation, so that a constant speed cycle, as a function of the position of the conveyance in the shaft, is achieved irrespective of load and direction of wind. Rates of acceleration and retardation which can be obtained at any point in the wind are controlled to within safe limits; further, torque and current limiting features are provided.

Keps of ordinary type cannot be used with a friction



Nickel-copper ore being dumped from a bottom discharge skip at International Nickel's Frood-Stobie mine in the Sudbury district of Ontario



Shaft arrangements, showing on left upcast service shaft with two-deck cage, and on right downcast shaft with two 3,000-ton per day winders. The shafts are each of 24 ft. dia. and the balance weights in the downcast structure have been brought towards centre by the use of deflecting sheaves.

winder as the load would be removed from the ropes and slip would result. Normally, therefore, tilting platforms will be necessary to allow for decking errors and rope stretch. However, the ideal is always to have perfect decking, and to this end a special keps has been designed and is in use in Northern Sweden. It will be recalled that the keps in use with the Heavy Duty hoist at Kiruna, Sweden, were described briefly in *The Mining Journal* of October 15, 1954.

TOWER DESIGN

It is becoming evident that generally steel towers will be preferable to reinforced concrete. In the case of an existing shaft being re-equipped it will be found advantageous to build the tower over the existing headgear and to get everything ready for the final changeover during, say, a holiday period. In this way there should be no insuperable difficulty in simultaneously changing over even two winders at the same colliery. This method is illustrated on the opposite page, and it is interesting to note that on another page in this issue our East African correspondent mentions its use at the Mpanda lead mine, Tanganyika.

The tower-mounted friction winder opens up the prospect of a single-building mine. In the Swedish iron ore mines this conception is already in being and the advantages that strike one immediately are saving in space, building costs, lighting and heating and above all the ability to use gravity flow practically all the way from shaft conveyance to wagon. Extra height above ground level is easily and relatively cheaply obtained. The skip discharge point or alternatively the car circuit can therefore be at high level. The simplest arrangement would be to have skip winding using a single skip with counterweight.

SHAFT CAPACITY

In many mines, the potential shaft capacity is not realized or utilized. With friction winders, using either single skip or single cage winding, the possible daily outputs are given in the table opposite. It has been assumed that winding speeds will not exceed 50 ft. per sec. with practicable decking times and that a day comprises 13 hours actual winding time. The depth has been taken at 2,400 ft. and three-deck cages have been assumed.

SHAFT CAPACITIES		
<i>Shaft Dia.</i>	<i>Output in tons per 13 hours</i>	
<i>ft.</i>	<i>Cage</i>	<i>Skip</i>
6	500	1,600
9	1,000	3,800
12	1,400	6,200
15	2,900	8,800
18	4,600	—
20	5,500	—
24	6,500	—

In view of these figures, it is clear that in most cases with sizeable shafts all the output can be concentrated in one shaft, leaving the upcast shaft for service duty. This permits considerable simplification of the surface and underground car circuits; minimum size insets and pit bottom in the upcast shaft and economy in manpower. With the counterweight system there is no difficulty in providing a single large cage in the service shaft which will facilitate conveyance of bulky material and which, with say two decks, will deal with all the manwinding on even a large mine.

BENEFITS OF FRICTION WINDING

Shaft sinking is expensive, a 24 ft. dia. shaft may cost over £600 per yd. all in, while a 20 ft. dia. shaft may cost about 15 per cent less. The table shows that from output considerations it is scarcely ever necessary to exceed a 20 ft. dia. shaft. In regard to ventilation the issue is less clear, and even with a 24 ft. dia. shaft the effective ventilation capacity can be so badly restricted by poor arrangement that a 20 ft. shaft well designed might prove as efficient.

Investigation of a number of cases, covering from very small to very large new installations, shows that without doubt friction winders are by a good margin the more economic as compared with conventional methods.

To obtain a true comparison one needs to take into account not only the cost of the winding engine itself with electric drive and control gear, but also headgear or tower, winding engine house, foundations, decking gear and keps, shaft equipment and cost of the various landings and pit bottom and any difference in ventilating cost arising from the layout of the shaft equipment.

MACHINERY AND EQUIPMENT

A Tractor For Overseas Use

The County Fourdrive tractor was produced in answer to overseas requests for a machine capable of higher operating speeds than the crawler tractor yet with sufficient power to attain a high proportion of the crawlers drawbar performance. The machine, powered by the new 40.56 h.p. Fordson Major Diesel Engine at rated speed of 1,600 r.p.m. has been developed by County Commercial Cars, Ltd., who have incorporated their crawler experience in the design to produce a four-wheel drive tractor of similar characteristics. The maintenance of the County crawler is well established in conjunction with the organization of The Ford Motor Company Ltd., service facilities.



The County Four Drive tractor operating Onions model 3-4 scraper

In addition to the NIAE official test, the manufacturers have investigated the machines' uses in specialized fields and the following observations were made.

Fitted with a Boughton 4000 Winch (max. pull 16,500 lb.) and 13 in. by 24 in. ballasted tyres and a pressure of 12 lb. per sq. in., the machine operated in wet autumn conditions, hauling timber without skid pan or timber arch and weights of 3 to 3½ tons at an average speed of 2 to 3 m.p.h. The manufacturers state in addition that earthmoving tests revealed that its high top speed drawing a 3 cu. yd. scraper enabled the full cycle of digging, hauling, dumping and returning, to be carried out at approximately half the time needed by a crawler of like horsepower and over a sustained period, shifting the equal of a heavy crawler drawing a 9 yd. scraper. The unit thus has applications in the opencast mining and quarrying industries.

Barrier Creams for Industry

Intensive research into the high incidence of occupational dermatitis among workers in several key industries has resulted in the development of four new barrier creams which were shown by Rozalex Ltd. for the first time at a recent London exhibition. They are Rozalex No. 9, a water-resistant cream providing a tough flexible film on the skin for protection against organic solvents, plastic materials, printing and duplicating inks, synthetic resins and so on; Rozalex No. 10, evolved for use where the hands are in contact with explosive materials or substances with a high rate of toxic absorption through the skin; Rozalex No. 11, a water-soluble cream particularly satisfactory against paints, varnishes and heavy oils, and Rozalex No. 12, protecting the skin against pitch, tar and other materials known to be photo-sensitizers. These new barrier creams are displayed with the full range of Rozalex protective preparations and re-conditioning ointments.

German Machinery for Iron Ore Sintering to be Made and Sold in U.S.

German-developed complete iron ore sintering and pelletizing plants for the ore and steel industries will be manufactured and marketed in the United States by the Machinery Division of the Dravo Corporation, Pittsburgh, Pennsylvania.

The American company has concluded an exclusive licensing agreement with Lurgi Gesellschaft für Chemie und Huttenwesen, GmbH, Frankfurt, A.M., Germany, Europe's oldest and foremost designer of ore sintering machinery, covering manufacture and distribution of the German designed equipment on this

side of the Atlantic. The Dravo-Lurgi machinery will be an adaption of the Lurgi Chemie basic design in accordance with American requirements.

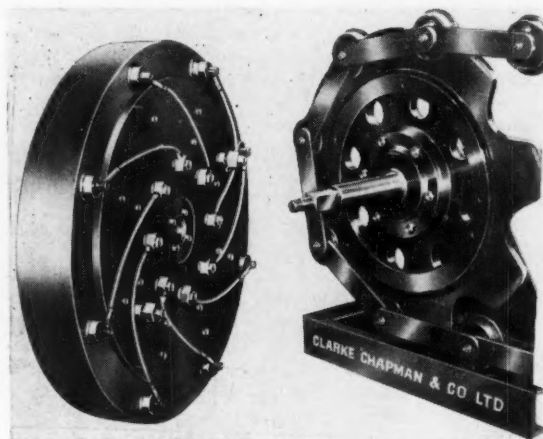
Hand Forged Steel Balls

Steel balls are the modern grinding media for reducing mineral ores, coal, stone, cement and other materials, and the steel balls manufactured by F. J. Brindley and Sons (Sheffield) Ltd. are represented as being unique in as much as each ball is forged individually by hand. Each ball is presented as being an accurate sphere when completed and the method is stated to give a longer life than is enjoyed by balls made in drop stamps. The sizes of the balls range in diameter from 1 in. to 4 in.

An Automatic Chain Lubricator

A new automatic chain lubricator, now being produced by Clarke Chapman and Co. Ltd. is designed for use with all types of chain conveyors and can be engaged or disengaged, assembled or dismantled as a complete unit, while the conveyor is running. The lubricator is arranged to work in conjunction with the chain sprocket wheels and is quite independent of chain speed. All mechanism of the lubricator is totally enclosed inside an oil tight aluminium case which forms an oil bath providing splash lubrication for the mechanism itself.

Various sizes are available depending upon the number of teeth in the sprocket wheel and the pitch of the chain. However, with two lubricators fitted at the tail end of a conveyor the increase in overall width of the conveyor is normally never more than 18 in. When necessary the lubricators can be fitted at the driving head end of the conveyor. The lubricators are mounted on a stationary stub type axle. The conveyor sprocket wheels, mounted on bearings, are free to rotate upon the axle. Although the centre portion of the lubricator can slide along the axle, it cannot rotate as it is locked radially by a square formed at the axle end. The casing of the lubricator is free to rotate round the stationary centre.



The automatic chain lubricator. This model is fitted with eight plungers

As the lubricator casing rotates each rocker arm is raised in turn and pushes forward its plunger. The self-centering end of the plunger engages at the correct moment with a chain nipple. The lubricant is then forced by the injector rams at high pressure through the nipple into the chain link pin. As the lubricator continues to rotate each rocker arm and plunger is withdrawn and each injector ram is recharged with lubricant.

METALS, MINERALS AND ALLOYS

COPPER.—Copper users in the United States were last week waiting anxiously for news of the Government's estimate of the current copper supply. The position was that although the Office of Defence Mobilization authorized deferral of delivery to the stockpile, and release of supplies from D.P.A. inventories, these were permissive authorizations; G.S.A. officials had, therefore, yet to say whether they would act on them in December. It has been estimated that about 41,600 tons have been distributed, of which 2,600 have been delivered to Canadian users, out of a total of 51,500 authorized.

On December 1, it was announced that only 7,603 tons of Government owned copper would be available until December 31, when the emergency distribution scheme is about to end. This cut in the release rate reflects the Government's anxiety to make good genuine deficiencies without in any way building up commercial inventories, which in turn reflects the Government's uneasiness that its stocks should be used as a buffer which is not in the best interests of either producers or consumers. At the same time it gives a pretty fair indication that the scheme is likely to terminate at the end of the year and will not be extended.

Demand for consumption in the United States is keen and, as the economy appears to be moving to a higher level, is likely to become more so. The October copper and brass mill fabricators' statistics again reflected the tight supply situation. Deliveries for actual consumption rose on the month from 106,628 to a 116,232 tons, the highest since October last year. Visible supplies (fabricators' stocks minus working stock) fell again to 31,719 tons, and have been roughly halved since July.

On the other hand outstanding orders at 135,140 tons fell for the first time since June. On the side of supply, considerable improvements should soon appear. December was the month in which—so the prophets were saying last Spring—the price of 30 c. would begin to be challenged by the flow of fresh supplies, particularly from the American mines. Mr. Garrett re-emphasized the imminent appearance of new American supplies to the Malone strategic materials sub-committee when he again quoted the figure of 250,000 tons of additional capacity that would come into being in the next few years, thanks mainly to Government guarantees. Mr. Garrett was speaking on behalf of the Defence Department's Research and Development Board.

There is little authoritative news of the new copper laws in Chile. Recent information had suggested that the idea of a copper institute had returned to favour in place of the copper corporation with monopoly selling power that was being mooted last month. Still later advices state that a copper department to be administered by the Central Bank has been proposed. The department would be presided over by the Minister of Mines and would include three representatives from the Central Bank, two from the copper companies, one from the unions and one from the National Mining Society and Employers Association. What has not been stated—and this is the core of the matter—are the powers of the proposed department, and these are now being discussed by a Congressional Committee. All these changes reflect the difference in political attitude of the President and his Congress, and there is no obviously predictable end to this struggle.

From the Copperbelt it is reported that a meeting took place last week at the request of the European union between the union and the Chamber of Mines on the subject of African advancement. There is no evidence at all of a changed attitude on the part of the union, but it is a hopeful sign that the union requested the meeting. Some European miners were laid off early in the week at Mufulira so that maintenance work could be done; the ban on overtime prevents it being done at week-ends. The men are now back at work.

Reuter reports from Tokyo that the Japan Mining Company has concluded a contract for the export of 2,000 tons of electrolytic copper to Australia and is negotiating a further contract with India.

LEAD AND ZINC.—Lead has been a steady but featureless market with no sign of a change in the price of 15 c. New York. Like the zinc producers, lead miners are anxiously awaiting news of another bout of stockpile buying and, also like the zinc producers, are at the same time claiming it is inadequate—though not so inadequate as for zinc.

Domestic deliveries of lead jumped sharply in October to 36,307 tons compared with 30,891 in September. On the other hand, production increased on the month from 47,762 to 51,276 tons and refinery stocks from 93,358 to 95,496 tons; a year ago stocks were 58,236 and though they have fallen from their peak of 109,302 at the end of May, they have been climbing back again since August.

Deliveries of automotive replacement batteries declined in October to 2,670,000 units from 2,728,000 in September, and 2,825,000 in October, 1953. Deliveries normally taper off in October and trade circles believe that the September figure represents the year's peak. However, since the automobile industry was rather late in getting into its stride this year, it is just possible that the figures will revive.

Demand for zinc has been generally steady and sometimes good in the past week in the United States. Galvanizers wanted prime western grade to fulfil keen orders for galvanized sheet while there was a good request from die casters for special high grade zinc to meet the needs of the automobile industry which is now getting back into its stride. Meanwhile, producers are expecting to hear this week that the Government stockpiles will be wanting their usual monthly quotas.

The National Lead and Zinc Committee has chosen the moment to declare that the Government's stockpiling programme is not giving adequate help to the American mines and has asked for higher taxes on imports or relief under the escape clause of the Reciprocal Trade Agreements Act. It is true that the President promised to review the lead and zinc mining industries' problem if his bigger stockpiling programme proved ineffective and it is also true that the programme has only lifted East St. Louis zinc by $\frac{1}{2}$ c. per lb. Nevertheless, much has happened since the President turned down the recommendation of the Tariff Commission and turned instead to stockpiling. First, the President was undoubtedly perturbed at the reception given (not only in Switzerland) to the higher duties on imported watches and watch parts. Secondly, there is now a Democratic Senate and Congress and the adherents to trade liberalization are in a stronger position since the election. Thirdly, the American economy, it is almost everywhere agreed, has turned the corner and trade liberalization can be more safely discussed (amendments to the Buy American Act are confidently forecast for January). Finally, the President could hardly raise import duties while G.A.T.T. is actually in session determining its very future particularly as American trading practice took a severe buffeting at the earlier meetings of the session.

Furthermore, before it is concluded that the stockpiling programme has failed it should be remembered that it has never approached the maximum permitted buying rate either for zinc or lead. On this side of the Atlantic, stockpiling always seemed an extraordinarily expensive way of helping the American industry and it is not difficult to sympathize with its critics. At the same time, the American lead and zinc mining industry has even less of a case for higher tariffs now than it had when President Eisenhower rejected its claim last May.

Slab zinc consumption in the United States in September totalled 73,266 tons against 73,179 tons in August. All users showed a slightly bigger consumption with the exception of the galvanizers; in the last two months, however, buying by galvanizers has been a feature of the market.

TIN.—Tin in New York has remained the featureless market that it has been now for some months. Nevertheless, interest everywhere is quickening as the time comes for ratifying the Tin Agreement, and the situation is made for speculation and rumour.

Adding further complication to markets are deals based on transferable account sterling. Tin suffers from being sufficiently

highly priced to make it a highly suitable commodity for such deals.

However, sterling has been under pressure long enough and unless there is a natural strengthening in the near future the authorities may possibly take stronger measures to support it in view of recurrent signs of inflation in the U.K. domestic economy. Fortunately, in December, sterling showed the first signs of a recovery.

The tin industry will certainly hope that sterling will recover—or be jerked back—fairly quickly as the critical period for the industry approaches.

CHROME.—Following the breakdown last month of a triangular barter deal between Turkey, the U.S.A. and Germany, involving the export of 200,000 tons of Turkish chrome ore, it is now reported from Washington that a barter deal has been concluded directly between the U.S. and Turkey involving the exchange of 100,000 tons of wheat for chrome ore. This latter will, of course, go to the stockpile. The previous negotiations broke down over Turkey's refusal to agree to the proposed valuation to be placed on the ore for barter purposes, but there is no indication in the reports reaching us of the price basis now agreed on. It may, however, be significant that the Turkish government has now reduced the duty on chrome exports from 5 per cent to 1 per cent which represents some compromise on its previously announced decision not to sanction any reduction in the export price below the level of \$39 per ton for 48 per cent ore.

Now it has been reported that The Turkish Etibank are negotiating for the export of chrome ore to the United States. Discussions on this subject in the past have always proved abortive because of Turkey's insistence on a higher price than the U.S. are prepared to pay. As the Etibank representatives have been reported as hoping to export \$6,000,000 worth of ore to the United States, it seems likely that the necessary price adjustments have now been made. Enquiry from West Germany is also reported.

URANIUM.—That Israel will be able to produce uranium on an industrial scale in the not too distant future stems from the interesting announcement by the chairman of the Israel Atomic Commission that a cheap method has been found of extracting uranium from phosphate deposits within the State of Israel, as well as a new method of making heavy water. So far the method of extracting uranium from the low grade phosphate deposits found in the Ivesev have been successfully tested in a pilot plant. The method of producing heavy water without the use of electricity had also been carried out on a laboratory scale but the results give reason to hope that the method used will enable production of heavy water to compete with the electrolytic method.

In Malaya the export duty on monazite—a phosphate of rare earth metals containing radio active thorium—will be restored to 10 per cent *ad valorem* from January 1, 1955.

Rumours that uranium deposits existed in the Philippines have been confirmed this week in the announcement by the Philippine Bureau of Mines that uranium had been discovered on the property of Philippine Iron Mines Incorporated. Ore samples tested in the United States have been declared good. The extent of the deposits has not yet been explored.

Australia has also come into the uranium picture again with the announcement by Mr. Gollan, Minister of Mines, that uranium discoveries near Carcoar, in Central New South Wales, were considered to be the richest yet made in the State, specimens yielding up to 12 per cent uranium oxide.

The London Metal Market

(From Our Metal Exchange Correspondent)

Tin has been a quiet market and there is very little to report. Metal for cash has been more freely offered and consumers have no difficulty in acquiring all the metal they require. An unwelcome feature which has reappeared in the market is dealings in switch sterling on account of the weakness in the sterling exchange rate. Because of this, U.K. dealers are at a considerable disadvantage compared with the Continental people who are able to utilize cheap transferable sterling. On Thursday morning the Eastern price was equivalent to £724½ per ton c.i.f. Europe.

The London copper market has been easier, probably due to some slight recession in Continental buying, and metal for next year's shipment has been more freely offered. At the same time consumption in this country is maintained at a good rate and current supplies are well taken care of. It is reported that the principal Rhodesian producers have already sold a considerable proportion of their production for the first half of next year.

The backwardation on lead narrowed quite appreciably as the end-of-November settlement approached when metal for the current period was more freely offered, evidently on behalf of Mexican and Yugoslavian producers. This selling caused some easiness in prices.

There has been very little movement in the price of zinc, but the undertone seems quite good with consumption well maintained in all the zinc-using industries. In America demand for zinc is fair, but stockpile buying takes regular quantities off the market, and if stocks there should continue to fall at anything like the rate seen in October the outlook for the zinc market generally would be considerably enhanced.

Closing prices and turnovers are given in the following table:—

	November 25		December 2	
	Buyers	Sellers	Buyers	Sellers
Tin				
Cash	£722½	£723½	£724	£725
Three months	£718	£718½	£720	£720½
Settlement		£723½		£725
Week's turnover	635 tons		630 tons	
Lead				
Current month	£103½	£103½	£104½	£104½
Three months	£101½	£102½	£103½	£103½
Week's turnover	3,350 tons		3,575 tons	
Zinc				
Current month	£80½	£80½	£81½	£81½
Three months	£80½	£80½	£81½	£81½
Week's turnover	3,450 tons		2,075 tons	
Copper				
Cash	£271½	£272½	£271	£272
Three months	£263½	£264	£261½	£262
Settlement		£272½		£272
Week's turnover	4,550 tons		6,050 tons	

OTHER LONDON PRICES — DECEMBER 2

ANTIMONY

English (99%) delivered,	
10 cwt. and over	£210 per ton
Crude (70%)	£200 per ton
Ore (60% basis)	22s./24s. nom. per unit, c.i.f.

NICKEL

99.5% (home trade)	£519 per ton
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OTHER METALS

Aluminium, 99.5%, £156 per ton	Osmium, £46 oz. nom.
Bismuth	Palladium, £6 15s. oz.
(min. 2 cwt. lots) 16s. lb.	Platinum, £30/£31
Cadmium (Empire), nominal	Rhodium, £43 10s. oz.
Chromium, 6s. 5d./7s. lb.	Ruthenium, £22 oz.
Cobalt, 21s. lb.	Quicksilver, £110
Gold, 251s. 7½d. f.o.z.	ex-warehouse
Iridium, £39 oz. nom.	Selenium, 35s. 9d. nom.
Magnesium, 2s. 4d. lb.	per lb.
Manganese Metal (96%-98%)	Silver 74½d. f.o.z. spot and
£225/£262	74d. f.d.
Osmiridium, £40 oz. nom.	Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC.

Bismuth	60% 8s. 3d. lb. c.i.f.
	50% 7s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semi-friable) 48%	£12 8s. 0d. per ton c.i.f.
Refractory 45%	£12 14s. 0d. per ton c.i.f.
Smalls 44%	£8 5s. 6d. per ton c.i.f.
Magnesite, ground calcined ..	£26-£27 d/d
Magnesite, Raw	£10 - £11 d/d
Molybdenite (85% basis) ..	102s. 4d. - 103s. per unit c.i.f.
Wolfram and Scheelite (65%) ..	195s. 0d./200s. 0d. - U.K. Gov't Stock d/d 197s. 0d. plus charges
Tungsten Metal Powder	17s. 0d. nom. per lb. (home)
(98% Min. W.)	
Ferro-tungsten	14s. 0d. nom. per lb. (home)
Carbide, 4-cwt. lots	£37 6s. 3d. d/d per ton
Ferro-manganese, home	£54 15s. 0d. per ton
Manganese Ore Indian c.i.f. Europe	
(46%-48%)	68d./70d. per unit nom.
Brass Wire	2s. 8½d. per lb. basis
Brass Tubes, solid drawn ..	2s. 1d. per lb. basis

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

The past week has been a poor one in the Stock Exchange; markets generally suffered a sharp setback. In the gilt-edged section, despite the continuance of favourable revenue returns, the weakness of sterling abroad led to rumours of a higher bank rate. Whether the Treasury will apply this corrective factor, in the middle of a large short dated funding operation, is doubtful; the question will be resolved as we go to press.

Kaffirs have been very much a political market. Following the burst of optimism two weeks ago, prices steadily declined and were finally capped by the appointment of Mr. Strydom as Prime Minister and the resignation of Mr. Havenga, who has built up a formidable reputation as a finance minister during recent years.

Finance houses made a varied showing. The feeling that the fall had gone far enough caused a recovery in Anglo American Corporation, Anglo French, Consolidated Goldfields and Rand Selection, but elsewhere prices were weak. Consolidated Goldfields made a particularly good effort, gaining against the ex-dividend quotation.

Individual Rand mines were mostly lower, being unable to combat the general trend. Recent favourites, such as Randfontein, Doornfontein and Western Reefs, suffered the most. Market attention has recently been drawn to one or two of the older properties. The price of gold has been steadily rising due to the fall of sterling overseas, and this factor undoubtedly has a strong influence on the profits of such mines as Simmer and Jack and Brakpan. Buyers of Sub Nigel were alone evident in an otherwise neglected market. Hartebeestfontein at first hardened on the better development results but later gave way following the general market malaise.

Political doubts also ruled the roost in the Orange Free State. Almost without exception recently popular stocks declined sharply. Bargain hunters came in, however, at the lower levels and Welkom were particularly affected by this factor.

West Africans again lacked interest and apart from some demand for Ariston, prices generally declined under scattered selling by weak holders. Here again, buyers were in evidence at the lowest level.

There was little activity in West Australians despite publicity that the local government are seeking to attract new industries to the area. This might possibly presage a milder political policy towards local companies.

Miscellaneous gold shares attracted little attention. Favourable press comment on the prospects and break up value of Goldfields Rhodesian Development brought about a slight hardening of this stock.

Among diamonds renewed interest was shown in De Beers and Anglo American Investment. This was reputed to emanate from the continent. The market reaction to the Consolidated African Selection Trust results was a fall in the share price. Platinums suffered from a renewed shakeout with a firmer tendency in late dealings on Wednesday.

Coppers were mixed, due to Mr. Prain's warning with regard to costs, but Chartered again ignored this and Selection Trust and Tanks were better due to special buying.

Eastern tin issues were mixed due to the varying results and dividends. Some of the stronger companies gained the turn but the majority succumbed to the general conditions prevailing.

Nigerians, despite the good Jantar results, eased on the chairman's cautious remarks with regard to the columbite outlook. Market circles believe, however, that the U.S.A. still requires a large quantity of this scarce mineral to complete their stockpile.

Barriers were mainly easier accompanied by most other lead/zinc producers. Mount Isa were an exception due to press comment concerning the good copper output and the probable effect on the company's figures in the future.

FINANCE	Price Dec. 1	+ or - on week	O.F.S.	Price Dec. 1	+ or - on week	DIAMONDS & PLATINUM	Price Dec. 1	+ or - on week	TIN (Nigerian and Miscellaneous) contd.	Price Dec. 1	+ or - on week
African & European ..	31	—	Freddies ..	6/9	—	Anglo American Inv. ..	8 1/2	—	Kaduna Prospectors ..	2/7 1/2	—
Anglo American Corps.	8 1/2	—	Freddies Consolidated ..	18/-	-1/3	Casta ..	27/-	—	Kaduna Syndicate ..	2/6	-1 1/2
Anglo-French ..	26/3	+1/3	F. S. Geduld ..	5 1/2	—	Cons. Diam. of S.W.A.	6 1/2	—	London Tin ..	6/6	—
Anglo Transvaal Consol.	24/4 1/2	—	Geoffries ..	18/-	-3d	De Beers Defd. Bear.	6	+ 1/2	United Tin ..	3/3	—
Central Mining (£1 shrs.)	44/-	-1/3	Harmony ..	39/3	-1/-	De Beers Pfd. Bearer ..	17 1/2	—			
Consolidated Goldfields	60/7 1/2	+7 1/2	Lorraine ..	14/9	+1 1/2	Pots Platinum ..	9/-	-6d			
Consol. Mines Selection	48/9	-1/3	Lydenburg Estates ..	23/1 1/2	-1/3	Watervaal ..	15/-	-7 1/2			
East Rand Consols.	3/3	—	Mariespruit ..	12/6	—				SILVER, LEAD, ZINC		
General Mining ..	5 1/2	—	Middle Wits ..	18/-	-3d	COPPER			Broken Hill South ..	53/-	—
H.E. Prop. 5/- Shares ..	10/1 1/2	-1 1/2	Ofais ..	77/6	-7 1/2	Chartered ..	93/9	+7 1/2	Burma Mines ..	2/6	—
Henderson's Transvaal ..	8/3	—	President Brand ..	73/1 1/2	-1/10 1/2	Esperanza ..	5/6	—	Consol. Zinc ..	37/9	-7/10 1/2
Johnnies ..	48/6	-1/9	President Steyn ..	42/9	-1/-	Indian Copper ..	4/9	—	Lake George ..	7/1 1/2	-6d
Rand Mines ..	3 1/2	—	St. Helena ..	27/9	-1/3	Messina ..	5 1/2	+ 1/2	Mount Isa ..	44/9	+3d
Rand Selection ..	45/7 1/2	+3 1/2	Virginia Ord. ..	13/3	-9d	Nchanga ..	10 1/2	—	New Broken Hill ..	35/3	-3d
Union Corp. (2 1/2 units)	34/3	-9d	Welkom ..	28/3	+3d	Rhod. Anglo-American	74/-	—	North Broken Hill ..	64/4 1/2	-1/7 1/2
Vereeniging Estates ..	4 1/2	—	Western Holdings ..	5 1/2	- 1/2	Rhod. Katanga ..	12/3	-3d	Rhodesian Broken Hill	11/3	-9d
Wits ..	38/9	-1/10 1/2			Rhodesian Selection ..	22 1/2	+1 1/2	San Francisco Mines ..	22/-	-1/6	
West Wits ..	42/6	-1/3			Rbokana ..	27 1/2	—	Uruwira ..	4/3	-3d	
			WEST AFRICAN GOLD			Rio Tinto ..	37 1/2	-1 1/2			
RAND GOLD			Amalgamated Banket ..	2/7 1/2	-1 1/2	Roan Antelope ..	19/-	-9d	MISCELLANEOUS		
Blyvoors ..	34/6	+1 1/2	Ashanti ..	7/3	-9d	Selection Trust ..	65/6	—	BASE METALS & COAL		
Brakpan ..	8/9	-3d	Bibiani ..	25/9	-1/9	Tanks ..	5 1/2	—	Amal. Collieries of S.A.	49/3	—
City Deep ..	16/-	-3d	Bremang ..	1/6	-1 1/2	Tharisa Sulphur Br.	7	—	Associated Manganese ..	41/6	-2/-
Consol. Main Reef ..	20/7 1/2	-1/10 1/2	G.C. Main Reef ..	4/4 1/2	-6d			Cape Asbestos ..	12/-	-3d	
Crown ..	46/3	-7 1/2	Konongo ..	2/9	-6d	TIN (Eastern)			C.P. Manganese ..	43/-	-1/-
Daggas ..	66/10 1/2	-7 1/2	Lyndhurst Deep ..	1/3	-1 1/2	Ayer Hitam ..	29/3	+3d	Consol. Murchison ..	52/6	-2/6
Doornfontein ..	31/6	-1/6	Marlu ..	1/6	-1 1/2	Gopeng ..	7/10 1/2	—	Mashaba ..	2d	—
Durban Deep ..	33/9	-1/3	Taqua & Abosso ..	3/9	-4 1/2	Hongkong ..	8/10 1/2	-1/-	Natal Navigation ..	2 1/2	—
E. Daggas ..	12/6	+1 1/2	W. Selection & Dev.	10/4 1/2	-1/3	Ipon ..	19/6	—	Rhod. Monteleo ..	1/3	—
E. Geduld .. (4/- units)	28/3	-6d			Kamunting ..	8/-	—	Turner & Newall ..	93/9	+1/3	
E. Rand Props ..	45/-	—	AUSTRALIAN GOLD			Kepong Dredging ..	3/6	—	Wankie ..	17/-	—
Geduld ..	3 1/2	—	Gold Mines of Kalgoolie ..	14/3	-3d	Kinta Tin Mines ..	10/9	—	Witbank Colliery ..	4 1/2	—
Govt. Areas ..	12/3	—	Great Boulder Prop.	8/4 1/2	-1 1/2	Malayan Dredging ..	28/4 1/2	+4 1/2			
Grootvlei ..	18/9	-6d	Lake View and Star ..	14/10 1/2	-6d	Pahang ..	11/-	+4 1/2	CANADIAN MINES		
Libanon ..	8/9	-6d	Mount Morgan ..	18/3	-3d	Pengkalan ..	9/3	-3d	Dome ..	\$31	—
Lipuaards Vlei ..	20/-	-9d	North Kalgoolie ..	8/6	-3d	Petaling ..	7/9	-1 1/2	Hollinger ..	\$30 1/2	—
Marievale ..	20/9	-6d	Sons of Gwalia ..	5/-	-3d	Rambutan ..	6/4 1/2	-9d	Hudson Bay Mining ..	\$101	+1 1/2
Modderfontein East ..	17/6	-1/3	Western Mining ..	11/4 1/2	—	Siamese Kinta ..	18/9	-3d	International Nickel ..	\$107 1/2	+3 1/2
New Klainfontein ..	11/6	-3d			Southern Kinta ..	25/3	—	Mining Corp. of Canada	\$156	—	
New Pioneer ..	71/6	+3d			S. Malayan ..	11/3	—	Noranda ..	\$136	—	
Randfontein ..	21/3	-1/3	MISCELLANEOUS GOLD			Sungei Kinta ..	12/6	—	Quebec ..	\$7 1/2	—
Robinson Deep ..	21/3	-1/3	Cam and Motor ..	9/6	—	Tekka Taiping ..	6/6 1/2	-2 1/2	Yukon ..	37 1/2	—
Rose Deep ..	14/6	—	Champion Reef ..	4/6	—	Tromoh ..	26/3	—			
Simmer & Jack ..	5/-	-3d	Falcon Mines ..	7/10 1/2	—				OIL		
S.A. Lands ..	23/9	-4 1/2	Globe & Phoenix ..	23/-	+1 1/2	TIN (Nigerian and Miscellaneous)			Anglo-Iranian ..	17 1/2	—
Springs ..	3/1 1/2	-6d	G.F. Rhodesian ..	7/7 1/2	-1 1/2	Amalgamated Tin ..	14/9	+3d	Aper ..	30	-6
Stilfontein ..	28/-	+7 1/2	London & Rhodesian ..	5/6	—	Beral Tin ..	24/9	+3d	Attock ..	47/6	—
Sub Nigel ..	40/7 1/2	-1/3	Metapa ..	1/9	—	British Tin Inv. ..	7/-	-1 1/2	Burmah ..	6 1/2	+ 1/2
Van Dyk ..	13/-	-6d	Mysore ..	5/-	-1 1/2	Ex-Lands Nigeria ..	18/7 1/2	+6d	Canadian Eagle ..	41/9	-1/3
Venterspost ..	17/9	-6d	Nundydoo ..	6/6	+1 1/2	Gevor Tin ..	13/3	—	Mexican Eagle ..	23/-	—
Vlakfontein ..	35/9	-6d	Ooregam ..	4/6	—	Gold & Base Metal ..	3/-	—	Shell (bearer) ..	6 1/2	—
Vogelstruif ..	6 1/2	-7 1/2	St. John d'el Rey ..	13/6	-3d	Jantar Nigeria ..	9/9	-1/-	Trinidad Leasehold ..	29/6	-2/-
West Driefontein ..	52/6	-1/3	Zams ..	43/9	+6d	Joe Tin Area ..	14/9	—	T.P.D. ..	29/3	+3d
W. Rand Consolidated	47/6	—						+6d Ultramar ..	30/3	+1 1/2	
Western Reefs ..	47/6	—									

COMPANY NEWS AND VIEWS

Some Copperbelt Accounts Analysed

Several of the points raised by Sir Ernest Oppenheimer and Mr. R. L. Prain in their respective statements to shareholders of Rhokana Corporation, Roan Antelope and Mufulira mines were discussed in last week's issue and thus only the statistical position which reflects the mines' state of well being remains to be assessed.

The simultaneous publication of the reports and accounts of three out of the four Northern Rhodesian copper producers provides an unusually good opportunity for statistical comparison. In the case of Rhokana, however, its importance as a copper mining investment company makes it essential when making any valuation of the shares to take this function fully into account. In this connection, our remarks last week concerning the company's investment portfolio vis à vis the mine are particularly pertinent. From a study of the financial and technical tables set out below few would agree that Rhokana Mines merits the low market quotation accorded it. But without doubt technical considerations such as the heavy price of the shares play a significant part in this matter.

When viewing the costs of Roan Antelope and Mufulira Copper Mines it is important to remember that owing to the inclusion of refining expenses overseas and the fact that costs are now expressed on a delivered basis instead of a f.o.b. basis, figures under this heading are not on all fours with those recorded for the previous year. Rather than making a strict comparison, therefore, investors would be better advised to look at absolute figures for the past year. In addition to another £5 per ton costs which must be expected to arise during the current year from increases in the cost of power and railways a further £10 per ton should be added representing provision for replacements.

Roan Antelope Copper Mines

Of the total copper production at this mine, 31,829 tons were refined overseas into electrolytic copper and the balance was available as blister copper. Total costs for electrolytic copper were just under £137 per ton in the past financial year.

Year to June 30	Total Profit	Taxation	Net Profit	Dividends*	To Reserve	Carry Forward
	£(000)	£(000)	£(000)	£(000)	£(000)	£(000)
1954	8,036.6	3,308.0	4,676.9	3,932.1	750.0	93.4
1953	9,352.7	4,565.1	4,736.6	4,213.0	2,750.0	52.6

* 1954 dividends paid net (1953—only interim £617.9 net, final £3,595.1 paid without deduction of tax.)

The lowering of the grade at this mine in comparison with that of the previous year was deliberate and has improved mine extraction.

Year to June 30	S.tons milled (000)	% Cu.	Copper recovered† (t.ons)	Av. cost per ton £	Ore Reserves Tons	% C.I.
1954	5,309.5	2.2	88,678	120*	90,969.9	3.2
1953	4,845.6	2.3	87,307	113†	90,414.9	3.2

* Average cost delivered buyers.

† Cost f.o.b. Beira including realization expenses, administration charges, marine freight, and insurance on certain tonnages delivered buyers.

‡ Blister

Dividends paid on the company's issued ordinary capital of £8,987,688 in 5s. stocks or shares amounted to 2s. 2½d. net. At a price of around 19s. 6d. the 5s. ordinary shares of the company yield just over 11 per cent.

Mufulira Copper Mines

Arrangements were concluded during the year whereby members purchased Mufulira's holding of 1,000,000 shares of £1 each in Chibuluma Mines Ltd. for cash at par, and subscribed in the aggregate £750,000 as initial share capital of the two new companies, Baluba Mines and Chambishi Mines. These two new companies have purchased Mufulira's Baluba and Chambishi special grants, together with other special grants and exclusive prospecting licences.

Year to June 30	Total Revenue	Taxation	Net Profit	Dividends*	To Reserve	Carry Forward
	£000	£000	£000	£000	£000	£000
1954	22,061.9	3,543.0	4,835.9	5,569.4	1,050.0	121.5
1953	20,491.8	3,842.0	3,589.6	2,811.1	2,750.0	125.0

* 1954 paid net and included special interim dividend £1,750.0 (1953—NIL). (1953—only interim £672.2 net; final £2,138.9 paid without deduction of tax.)

In order to provide members for the purchase of the Chibuluma shareholding, and also for share subscription moneys for Baluba and Chambishi, a special interim dividend of

£1,750,000 was paid to Mufulira general reserve, as at June 30, 1954.

Year to June 30	Tonnage Milled S.tons (000)	% Cu.	Copper recovered (t.ons)	Av. cost per ton £	Ore Reserves S.tons (000)	% Cu.
1954	3,606.2	3.24	87,972†	109*	132,065.0	3.48
1953	2,963.4	3.35	76,089	114†	136,730.0	3.48

* Average cost delivered buyers.

† Record production for mine.

‡ Cost f.o.b. Beira including realization expenses, administration charges, marine freight, and insurance on certain tonnages blister copper delivered buyers.

§ Blister

Of the total copper production 36,388 tons of electrolytic cathodes were produced at Mufulira, of which 17,721 tons of electrolytic shapes were refined abroad, for which total costs were over £125 per ton.

Rhokana Corporation

Rhokana's investment portfolio consists in the main of 34 per cent of Mufulira, 27 per cent of Nchanga Consolidated and 48 per cent of Bancroft Mines.

Year to June 30	Total Profit*	Taxation	Net Profit	Dividends	To Reserve	Carry Forward
	£(000)	£(000)	£(000)	£(000)	£(000)	£(000)
1954	13,146.2	3,450.0	9,536.5	6,287.2	3,500.0	516.0
1953	12,334.7	3,803.4	8,383.5	5,671.1	2,800.0	366.7

* Net investment income £3,659.9 (1953—£2,243.6).

Dividends paid on the issued ordinary capital of £2,500,002 in stock units of £1 amounted to 50s. net. Rhokana ordinary £1 units at their present level of about £27½ yield just over 9 per cent.

Year to June 30	S.tons ore milled (000)	% Cu.†	Copper recovered* (t.ons)	Av. costs per ton £	Ore Reserves tons (000)	% Cu.
1954	4,138.5	2.59	79,755†	127.5	96,036.2	3.20
1953	3,629.0	2.58	74,216‡	117.5	96,534.8	3.19

* Also 693 short tons Cobalt (1953—259 short tons).

† In addition 0.154 per cent cobalt (1953—0.150 per cent).

‡ Blister

Cobalt metal production showed a particularly satisfactory increase during the past year as experience was gained with the new plant and initial operating difficulties were overcome. Further work now in hand on the cobalt plant is expected to lead to increased metallurgical efficiency and a higher production rate in the future.

Rhodesian Selection Trust

This company's principle holding is its 64 per cent interest in Mufulira Copper Mines. The company also holds shares in Chibuluma, Baluba and Chambishi Mines.

Year to June 30	Group Revenue*	Taxation	Net Profit*	Dividends†	To Reserve	Carry Forward
	£(000)	£(000)	£(000)	£(000)	£(000)	£(000)
1954	22,347.2	3,550.5	4,811.8	2,316.0	2,181.2	269.3
1953	20,630.2	3,846.3	3,580.3	1,323.5	2,750.0	175.9

* Sales of copper £19,415.9 (1953—£18,188.3)

† 1954 dividend paid net (1953—only interim £672.2 net; final £2,138.9 paid without tax deduction.)

‡ Including minority interests £2,001.2 (1953—£1,010.1).

Dividends paid on the company's issued ordinary capital of £5,293,846 in 5s. shares amounted to 2s. 2½d. net per share. At the present price of about 21s. 6d. x.r. Rhodesian Selection Trust ordinary 5s. shares yield about 10 per cent. Owing to the company's large holding in Mufulira Mines this yield can be taken as applying also to the latter company.

Rhodesian Anglo American

Apart from its holding of nearly 53 per cent in Rhokana Corporation "Rhoanglo" has a direct and indirect participation amounting to about 39 per cent in Nchanga Consolidated Copper Mines and also holds shares in Bancroft Mines, Mufulira, and other companies.

Year to June 30	Group Profit	Dividend Income	Taxation	Net Profit*	Dividends	Carry Forward
	£000	£000	£000	£000	£000	£000
1954	23,695.8	1,945.4	8,288.1	18,177.1	4,818.7	910.6
1953	24,052.5	1,015.8	9,483.3	15,314.7	3,996.9	624.8

* Including £1,150.0 (1953—NIL) transferred from Sales Equalization Reserves, and Minority Interests £9,907.3 (1953—£8,599.3).

Dividends paid on the issued ordinary capital of the company of £6,425,000 in stock units of 10s. amounted to 7s. 6d. net. Rhoanglo 10s. stock units at their present price of about 75s. 9d. yield about 9.8 per cent.

Rand and O.F.S. Returns

Returns from Rand and O.F.S. producing mines for November were based on the fractionally lower gold price of 250s. 2d. as compared with 250s. 4d. in October. Both old and new mines made a good showing and an encouraging number of lower costs also appeared. Profits have recently been assisted by the increased price for gold since the re-opening of the London market, and although a gain of 2s. per oz. might at first sight appear somewhat trivial, this gain can make a useful addition to profits. For example, a mine milling 100,000 tons of ore monthly would benefit by as much as £10,000 or £120,000 in a full year.

Returns from the very new, and the not so new mines were particularly encouraging. President Brand was outstanding. Profits earned by this mine—now nearly in its fourth month of production—amounted to nearly £141,000 as compared with the maiden return of £50,000 in August. The milling rate since then has risen to 36,000 tons while the grade of ore has advanced from about 8 dwt. initially to 10.7 dwt. during October to which another 1 dwt. was added last month bringing the total to 11.8 dwt. per ton. Western Holdings also advanced its milling rate, this time from 51,500 tons to 56,000 tons, and profits rose to over £120,000 from £110,000 previously while costs dropped by 1s. 9d. to 55s. 9d. Welkom also announced better results during the past month. Tonnage milled amounted to 76,000 tons from 72,000 and profits expanded from about £11,500 to nearly £12,500; costs also fell by 1s. 1d. to 50s. A gain in working profit, tonnage milled and ounces produced was also recorded by President Steyn. St. Helena continued its steady progress and reported an increase in profits from about £82,000 to £88,000.

Amongst uranium-gold producers, West Rand Consolidated's profit of £220,000 compared with £205,000 in October, added to which a smaller loss was incurred from gold operations. Randfontein also showed up well, profits going ahead £5,000 to £80,000. On the other hand, Luipaards Vlei reported a fall in profits of £5,000 to £42,000. Tonnage treated dropped to 100,000 tons compared with 112,000 tons in October. These figures, however, refer to gold operations only which are at present being carried out on all but the uranium-bearing Bird Reef Series. Towards the end of the month a section of the mill was isolated for milling Bird Reef ore only. It is stated by the company that after the initial trial runs of the uranium plant, profits from uranium and gold in this section will be published monthly.

Géomines Continues to Plough Back Profits

The accounts for Géomines, the big Congo tin producer, which have recently been published for the financial year to June 30, 1954, show a decline in working profits. Nevertheless the decline was considerably smaller than might have been expected, having regard to the vicissitudes of the tin market for the period—a situation which may financially be attributed to the continuance during most of the year of the long-term sales contracts with the R.F.C. on the old 118 c. basis.

The profit and loss account shows a working profit of Frs. 94,790,978 (compared with Frs. 104,266,228 in the preceding financial period) while income from investments and sundry revenue amounted to Frs. 677,272. Against these earnings, general administrative charges are shown totalling Frs. 6,861,860 while taxation amounted in all to Frs. 7,222,394 and bank charges to Frs. 305,873, leaving a balance of Frs. 81,078,123, the whole of which was, as in the previous year, applied to amortization.

After writing down the company's fixed assets by the amount set aside for amortization, these items stand in the balance sheet at Frs. 809,442,354. All but some Frs. 35,000,000 of this total is represented by fixed assets in Africa, the net value of which remains substantially unchanged from a year ago at Frs. 774,582,353. The balance of current assets over current liabilities compares closely with that of a year ago at Frs. 254,659,403 compared with Frs. 263,674,769.

We publish elsewhere on page 659 extended extracts from the directors' report which has been circulated to shareholders with the accounts in advance of the annual general meeting to be held in Brussels on December 14. Points of particular interest arising from this report include a more detailed analysis than we have had in recent years of the company's ore reserves in its three main classes of orebody, together with some indication of the progress which has been made towards the production of lithium carbonate on a commercial scale.

Mount Isa's Copper Production

Following the preliminary profit statement by Mount Isa, the Australian base metal producer, published in the *Mining Journal* November 19, pages 586, and 587, the full report and accounts for the year ended June 30, 1954, have now been received. The most important feature of the past year's operations was that after the many delays experienced, copper production operations were firmly established. It was, in fact, due to the sharply increased tonnage of copper bearing ore milled during the year that raised total tonnage treated to the highest level since operations at the mine started.

Year to	Tons ore	Cost*	Tonnage of metals recovered			
June 30	treated	£ s.	Lead	Zinc	Copper†	Silver
1954	1,210,980	4 5-1	37,926	20,512	19,869	3,090,936
1953	847,900	4 10-6	38,536	21,413	5,477	3,195,374

* Australian currency per dry ton of ore treated. Including delivery of lead bullion and blister copper into ships' holds at Townsville, but excluding ocean freight, refining and lead bonus payments.

† Excluding 682 tons of copper in dross (1953—576 tons)

Despite the lower prices received for both lead and zinc, economic copper operations no doubt reduced working costs added to which revenue from this source boosted net profits to £A2,096,274 against £1,668,663. Distribution on the company's issued ordinary capital of £A5,757,312 in stock units of £A1 was raised to 20 per cent as against 15 per cent in respect of the previous year.

Total development footage accomplished during the year showed a slight increase from 16,760 ft. to 17,049 ft. In this sphere also the emphasis was on copper production and while development work in respect of this ore was approximately doubled over the previous year's level, that in respect of lead ore showed a fall. At the end of the financial year ore reserves were 9,900,000 tons containing 8.7 per cent lead, 6.1 per cent zinc and 6.3 oz. of silver per ton. Copper ore reserves amounted to 3,700,000 with a value of 4.2 per cent copper.

Production figures for the first four months of the current financial year show that copper production has made a further advance, a total of 8,245 tons of blister (6,890) having been produced. Lead-silver bullion output was also up to 13,275 (11,296) while zinc concentrates produced declined slightly to 13,086 tons as against 13,940 tons previously. Mr. G. R. Fisher is chairman. Meeting, Brisbane, December 6.

Lake George Again Makes Loss

A preliminary profit statement issued by Lake George Mining Corporation, important Australian base metal producer, discloses that a loss of £31,997 was incurred during the year to June 30, 1954, as against the previous loss of £9,099. This figure was struck after providing £72,237 (£63,856) for depreciation. After writing back provisions for taxation no longer required of £41,605 (£53,870) and taking into account the previous year's unappropriated profits of £71,692, a balance of £81,300 was carried forward.

The Lake George Mine has been on a care and maintenance basis since the end of June, 1954, pending the settlement of a labour dispute. At a recent meeting of the Industrial Arbitration Court of New South Wales, the Executive of the Australian Workers' Union accepted terms for a resumption of work. But these were rejected at a later meeting of the local branch of the A.W.U. at the mine. Mr. R. M. P. Preston is chairman. Meeting, London, January 11.

Casts Pays Same on Lower Earnings

The total value of diamond sales by Consolidated African Selection Trust during the year to June 30, 1954, was maintained at approximately the previous year's level. On the Gold Coast, despite an increase in output, a reduction in the industrial diamond price resulted in less revenue earned. This fall was, however, offset by a better gem price which countered the lower production at Sierra Leone, and brought in larger profits.

Year to	Group	Taxa-	Net	Divi-	To	Carry
June 30	Revenue*	tion	Profit	dends	Reserve	Forward
	£	£	£	£	£	£
1954	2,227,957	1,412,000	815,957	625,579	380,546	323,067
1953	2,463,872	1,412,000	1,051,872	625,579	550,542	303,235

* Diamond production profits £2,059,327 (1953—£2,239,271).

Dividends on the issued ordinary capital of £1,516,555 in ordinary stock units of 5s. were maintained at the previous year's level of 75 per cent. Consolidated balance sheet figures reveal that the total assets of the company rose to £9,034,509 as compared with £8,857,158 previously. Current assets of the group advanced to £6,199,607 (£6,061,174) and exceeded current

liabilities by about £2,400,000, of which over £3,500,000 were represented by cash and tax reserve certificates. Government securities had a market value as at June 30, 1954, of £1,375,780.

Mr. A. Chester Beatty is chairman. Meeting, London, December 21.

Exchange Losses Offset Lampa's Increased Profit

Despite substantial increase in production during the year ended June 30, 1954, due to the introduction of double smelting with two furnaces at the Lampa Mining Company, the larger profits earned in Peruvian currency had to bear a heavy depreciation in terms of sterling due to exchange losses. Prices of silver and copper on the whole remained very steady throughout the year with silver at 85½ c. per oz. and copper at around 29½ c. per oz.

Year to June 30	Matte Output*		Assay per ton*		Yield		Recovery %	
	(Tons)	%	(000 oz.)	(tons)	(000 oz.)	Copper	Silver	Copper Silver
1954	1,615	29.8	192.9	482.0	311.7	87.0	88.8	
1953	1,055	28.1	245.1	296.7	258.6	83.7	86.7	

* Metric tons

Mr. J. Shirley Esplen, chairman, informed shareholders that the construction of the company's new 50-ton Segregation Plant was completed last June. A number of teething troubles have been encountered and further delay is anticipated due to the necessity of installing a dust extraction plant. When the plant is in full operation, however, a lower grade of ore than at present should become economically workable with a consequent improvement to ore reserves. But news regarding this new development should not be expected until next year.

Year to June 30	Total Profit	Taxa- tion	Net Profit	Divi- dend	To Reserve	Carry Forward
1954	35,895	20,648	23,637	5,755	11,000	6,862
1953	41,615	24,566	29,165	5,755	15,000	8,390

Dividends on the company's issued ordinary capital of £70,000 in stock units of 1s. were maintained at last year's level of 15 per cent.

The smelting campaign with two furnaces working together is continuing and the output of matte for the first quarter of the current financial year was 439 tons which was well up to the average of the past year. Meeting, Liverpool, December 20.

Sharp Production Increase by Renong

Operations by the Renong Tin Dredging Company during the year ended June 30, 1954, were again primarily dependent on No. 2 dredge at Rasa. But due to an exceptionally rich deposit of virgin tin ore being encountered—from which a remarkably high yield was obtained, the output achieved was very different from that of the previous year. The area concerned was the submerged township of Kuala Kubu from which a yield of 30.16 oz. of tin concentrates per cu. yd. was obtained. In consequence, No. 2 dredge produced 967 tons from the company's total output of 1,106 tons—the remaining 139 tons being supplied by No. 3 dredge. During the year proceeds of tin ore sales averaged £477 per ton, compared with £637 previously. But despite this substantial drop, the increase in output resulted in a sharp increase in profits earned.

Year to June 30	Total Revenue*	Taxa- tion	Net Profit†	Divi- dends	To Reserve	Carry Forward
1954	534,394	154,507	239,618	45,376	40,000	26,495
1953	236,028	44,591	44,495	30,892	NIL	26,760

* Including tin ore proceeds £520,266 (£212,021). Also tin tribute receipts £4,280 (1953—£6,646)

† After mining costs of £137,515 (1953—£88,820)

Dividends on the issued ordinary capital of £200,000 in shares of £1 were accordingly raised to 45 per cent, as compared with 30 per cent for the preceding period.

The chairman of the company, Sir John Hay, in his statement to shareholders referred to the recent reconstruction of the Gombak dredge (the company's largest dredge) at Jinjang, which was completed in June. Five months' operations in the new area had exceeded estimates and an encouraging start had thus been made to the new venture. Recommissioning of No. 3 dredge to treat ground previously worked, is, he said, an experiment. Only a short-term view of prospects can, therefore, be taken. To date, however, operations have been profitable.

Production in the first four months of the current financial year shows a striking improvement on last year's corresponding figure, rising to 404½ tons of tin ore recovered as against 287½ previously. But as Sir John states clearly, these results have

exceeded anticipations and such a high rate is not expected to be maintained throughout the year.

Renong 5s. ordinary shares now stand at around 12s. 9d. at which price they yield nearly 17 per cent. Meeting, London, December 13.

Fresnillo's Exchange Losses

There was a considerable decline in the gross revenue from sales of metals and ore produced by the Fresnillo Company during the year ended June 30, 1954. This fell to \$17,965,634 as against \$18,791,208 in the previous period, while income from other sources also declined to \$40,333 from \$65,324.91.

However, the drop in net profits was more serious, and the figure of \$306,984 earned was barely half the previous corresponding amount of \$645,307. But this was not due to any fault of the company and was primarily the result of a \$202,397 loss (\$24,375) which arose from a devaluation of the Mexican Peso in terms of the U.S. dollar from P8.62 to P12.50.

Accordingly, dividends on the company's issued capital stock of \$1,050,000 in Common Shares of \$1.00 par value were decreased to \$.23 as compared with \$.61 previously. The earned surplus carried forward at the year's end was \$5,479,378 as against \$5,558,641 in respect of the preceding period. Mr. W. Mason Smith is president.

Powell Duffryn to Sell Vacuum Oil Holding

It is announced that arrangements have been concluded for the sale of the £7,250,000 5 per cent Vacuum Oil Loan stock held by Powell Duffryn at a price of £101 per £100 stock. The first half year's interest payment due on November 1 next will, however, be received by the company.

As a result of this sale, consideration is now being given to the preparation of a capital reorganization scheme—which will not necessarily depend upon a prior settlement of the company's claims against the N.C.B.—for submission to shareholders.

During the year ended March 31, 1954, total revenue earned by the company showed a sharp rise due to the inclusion in the accounts of an amount of £385,011 which represented interest on unpaid compensation due to the company under the Coal Nationalization Act.

Year to Mar 31	Total Revenue*	Taxa- tion	Net Profit	Divi- dends	Carry Forward
1954	1,108,581	750,047†	1,032,967	720,062	519,111
1953	1,162,240	373,200	920,027	542,271	508,659

* Excluding £80,000 transfer from taxation reserves (1953 - £50,000)

† Including Additional Interim Income negotiable under Coal Nationalisation Act £385,011 (1953 - Nil)

Dividends on the issued ordinary capital of £9,660,471 in ordinary shares of £1 amounted to 8 per cent leaving total distribution unchanged from that of the previous year.

With regard to the coal assets taken over by the N.C.B., Sir Herbert Merrett, the chairman, hopes the "cleaning up process" concerning valuation of the company's mines will be reached by the end of the current year. Furthermore in the case of the company's Electricity Undertaking, which the National Coal Board took over nearly eight years ago, valuation proceedings are now in their final stages and it is expected that the ultimate position will be shown in next year's accounts. Sir Herbert, in referring to his previous estimate that £15½ million compensation would be received by the group for assets vested in the N.C.B., now states that this figure is more likely to be an under-estimate than otherwise.

The capital and reserves of the group shown in the accounts as at March 31, amounted to over £26½ million excluding about £13½ million received on account in respect of compensation. Current assets exceeded current liabilities and taxation reserve by approximately £12 million.

Powell Duffryn ordinary shares now stand at around 40s. to yield just under 4 per cent.

Company Shorts

Maintenance of Operations by Dominion Reefs.—Mining operations carried out by Dominion Reefs (Klerksdorp) during the year ended June 30, 1954, resulted in a loss of £75,858 as compared with £67,205 in the preceding period. The adverse balance carried forward was, therefore, increased to £88,500 as against £12,642 previously. In view of this company's promising future prospects as a uranium producer the 5s. "A" shares at present stand at around 30s. 6d. Uranium production is

scheduled for mid 1955. Mr. R. Ellerton Binns is chairman. Meeting, London, December 6.

Klerksdorp Consolidated Reduces Adverse Balance.—Apart from drilling activities which have been carried out on Farms Rhenosterhoek No. 52 and Elandsheuveld over which mineral rights are held, Klerksdorp Consolidated Goldfields' main interest is its holding of 146,933 "A" 5s. shares of Dominion Reefs (Klerksdorp). During the year ended June 30, 1954, a profit of £34,441 was made from sales of investments (1953—nil) which, together with other minor receipts, brought the adverse balance to be carried forward to the balance sheet down to £324,393 as compared with £333,197 previously. This company's prospects are dependent on the success of Dominion Reefs as a uranium producer and on the results of its own drilling programme. Mr. A. Hedley Williams is chairman and joint managing director. Meeting, London, December 14.

New Broken Hill Pays More.—An interim dividend of 1s. 3d. per share U.K. currency, or 25 per cent, has been declared on the £1,120,592 issued ordinary capital in 5s. shares of New Broken Hill Consolidated. This represents an increase of 10 per cent over last year's corresponding interim of 15 per cent which was followed by a final of the same amount, bringing total distribution for the year to 30 per cent.

Mount Morgan's Grade.—Particularly interesting was Mr. Newman's reference in his statement to shareholders now received to the rise in the grade of ore milled at Mount Morgan during the year ended June 26, 1954. This applied particularly to gold the average grade of which rose by 0.57 dwt. to a level of 3.02 dwt. go/d per ton, while the copper content rose only by .04 per cent to 0.96 per cent. This increase was not in keeping with the characteristic pattern of the deposit in which the proportion of copper to gold normally rises as mining proceeds. The departure from the normal trend was, in fact, due to an unexpected chute of limited dimensions containing high grade gold ore being encountered on No. 6 Bench.

The chairman also referred to the high pressure leaching technique which he has mentioned on previous occasions. Developments in this technique are still being continued overseas and results obtained have given hopes of ultimate revolutionary improvements in extractions and costs. Meanwhile, a study is being made of American methods in the hope of improving the company's extraction metallurgy.

Ipoh Tin Pays More.—Net profit earned by Ipoh Tin Dredging, the Malayan tin tributary and investment company, were almost doubled at £16,345 (£8,837) during the year ended March 31, 1954. Accordingly, the distribution made on the company's issued ordinary capital of £160,000 in stock units of 16s. was raised to 15.625 per cent as against 12½ per cent previously. This is equal to 2s. 6d. per share compared with 2s. in respect of the preceding period. It is also announced that dredging operations have been resumed by Sungei Kinta Tin Dredging in which the company holds a large interest. Mr. R. E. Binns is chairman. Meeting, London, December 22.

Leaseholds Pays Same on Dividend Capital.—With a recommendation of final dividend of 15 per cent, free of income tax, for the year ended June 30, 1954, Trinidad Leaseholds has maintained its previous year's distribution of 20 per cent on an issued ordinary capital of £3,278,904 in 5s. shares as doubled by the recent one for one scrip issue.

Year to June 30	Group Profit	Taxa- tion £	Net Profit £	Divi- dends £	To Reserve £	Carry Forward £
1954	4,971,623	3,119,994	1,851,629	655,781	800,000	585,233
1953	4,678,095	2,903,443	1,774,652	327,890	1,000,000	426,985

Production in respect of the first three months of the current financial year at 239,196 tons is running above that of 224,516 tons achieved during the previous corresponding period of last year. Mr. S. J. Vos is chairman. Meeting, December 21.

Zaaiplaats Earns Less, Pays Less.—Zaaiplaats Tin Mining Company, the South African producer, achieved an increase in total ore milled during the year to July 31, 1954, of 5,750 s.tons to 69,055 s.tons. Tin concentrates produced also rose to 351 l.tons as against 319 l.tons previously. Despite these increases, however, the very much lower tin price brought total revenue earned down considerably from the previous year's figure.

Year to July 31	Total Revenue*	Taxa- tion £	Net Profit £	Divi- dends £	To Reserve £	Carry Forward £
1954	614,817	24,586	45,400	40,162	2,500	75,786
1953	1,043,205	40,067	63,559	58,013	2,341	70,968

* From sales of tin metal £572,463 (1953—£1,002,328).

Dividends on the company's issued ordinary capital of £89,250

in shares of 5s. were reduced to 45 per cent as against 65 per cent for the preceding period. Mr. R. L. M. Warren is chairman. Meeting, Pretoria, November 26.

North Charterland to Issue 511,308 Shares of 1s. at Par.—In order to provide finance for the development of their wholly owned subsidiary company which carries on a transport business in Nyasaland, the North Charterland Exploration Company (1937) have decided to raise £25,565 by the issue of 511,308 shares of 1s. at par.

It was originally intended that the sale of the company's Goodwood Ranch and cattle thereon, together with the realization of certain unremunerative assets, should provide the necessary funds for the expansion and modernization of the subsidiary on which it is considered the future prosperity of the company primarily depends. Unfortunately, however, this is not now possible as the need for funds has become increasingly urgent and the sale of the Goodwood assets has not yet been fully effected. The issued capital of the company is now £51,131 in 1,022,616 shares of 1s. and after the issue will become £76,696 in 1,533,924 shares of 1s. The new shares will not rank for dividend in respect of the year ending December 31, 1954. Major General J. D. Shapland is chairman.

Kern Oil Pays More.—A preliminary statement discloses that the Kern Oil Company have recommended a dividend of 17½ per cent together with a bonus of 7½ per cent on the issued ordinary capital of £1,203,750 in ordinary stock units of 4s., in respect of the year ended May 31, 1954. This compares with the previous dividend of 15 per cent and bonus of 7½ per cent. Undoubtedly, the reason for this increase stems mainly from the higher level of production achieved by the company during the year, which rose to 329,289 tons as compared with 316,665 tons in the preceding period.

Net profit of the group, after depreciation and taxation rose to £411,852 compared with £316,584 of which the increased dividend absorbed £165,516 as against the previous figure of £148,964. Mr. G. W. Ivey is chairman. Meeting, London, December 17.

Rix-Athabasca Earns More.—A quarterly report has been received from the Canadian Rix-Athabasca uranium mine for the period July 1 to September 30, 1954, which reveals that the operating profit during this quarter has risen to \$113,128.88 as against the average of \$109,541.51 earned during the two previous quarters.

It is reported that the construction programme undertaken during the past few months is now practically complete. Capital expenditure during the recent quarter totalled \$69,067.24 in respect of improvement to mine plant and surplus building. This compares with the previous two quarter's total of \$118,866.06.

The report states that ore deliveries to the Eldorado Mill were maintained at the full rate contracted for between the company and Eldorado Mining and Refining.

Underground development was carried on to investigate ore intersections disclosed by earlier diamond drilling and additional stopes were prepared to enable efficient production operations for the daily ore tonnages required.

DIVIDENDS

Ayer Hitam Tin Dredging 20% (January 6)
Central Mining and Investment 3½% (December 21)
Consolidated African Selection Trust 60% (December 30)
Cons. Zinc Corporation 6¼% i (January 1)
Dunlop Rubber 4% i (December 18)
Gopeng Consolidated 5% i (December 20)
Griqualand Exploration and Finance 25% (December 30)
Jantar Nigeria 85% (December 22)
Lake View & Star 37½% (December 22)
New Broken Hill Consolidated 25% i (January 1)
New Jagersfontein Mining 2¼% (January 28)
Powell Duffryn 4½% Cum. Pref. 2¼% (January 1)
Rand Selection Corporation 2s. 3d. (January 4)
Rand Selection Corporation 45% (January 4)
Rhodesia Copper Refineries 5% (December 30)
Rhokana Corporation 5½% (December 30)
Rambutan 7½% (January 1)
Ransomes & Rapier 2% * (December 7)
South African Townships Mining and Finance 3d. (January 4)
S. African Townships Mining and Finance 2½% (January 4)
Standard Bank of South Africa 1s. i (January 28)
Tanganyika Concessions 45% (January 31)
Tekka-Taiping 5% i (December 3)
Trinidad Leaseholds 15% (December 29)
Vereeniging Brick and Tile 2¼% (December 30)
i interim * tax free

OCTOBER MINE RETURNS

WEST AFRICAN GOLD

Company	October, 1954			Months since year end	Current Financial Year Total to date			Months since year end	Last Financial Year Total to date		
	Tons (000)	Yield (oz.)	Profit (£000)		Tons (000)	Yield (oz.)	Profit (£000)		Tons (000)	Yield (oz.)	Profit (£000)
Amal. Banket	81	13,113	35.5	1	81	13,113	35.5	1	67	10,099	14.2
Ariston Gold	35	10,931	53.3	1	35	10,931	53.3	1	31	10,074	49.6
Ashanti	27	16,339	70.0	1	27	16,339	70.0	1	24	15,237	69.3
Bibiani (1927)	30	6,600	15.9	1	30	6,600	15.9	1	30	6,315	7.9
Bremang*	616	2,759	4.7	10	5,043	23,269	23.7	5	5,605	25,938	109.3
G.C.M. Reef	10	4,045	13.4	4	39	16,450	62.6	36	14,730	48.0	
Konongo	3	3,194	15.5	1	3	3,194	15.5	1	3	2,523	12.5
Lyndhurst Deep	9	1,173	6.9	1	9	1,173	6.9	1	9	1,172	5.7
Mariu Gold	39	3,272	10.3	1	39	3,272	10.3	1	39	4,388	21.3
T. & Abosso	29	5,860	1.0	7	194	41,428	26.8	174	32,157	75.1	

* Cu. yd. dredged

Profit figures include premium revenue

AUSTRALIAN GOLD

Company	4 weeks to Oct. 5 1954		4 weekly period since year-end	Current Financial Year Total to date		4 weekly period since year-end	Last Financial Year Total to date	
	Tons (000)	Yield (oz.)		Tons (000)	Yield (oz.)		Tons (000)	Yield (oz.)
Boulder Perseverance	10.2	2,325	7	72.0	16,911	70.6	17,032	
Central Norseman	12.2	6,788	7	84.8	45,890	83.2	41,760	
Central Victoria*	117.9	488	7	1,145.8	2,888	1,450.4	5,220	
Golden Horse Shoe	68.3	711	10	747.0	8,163	774.2	7,631	
G.M.'s of Kalgoolie	15.9	5,244	7	106.3	30,525	104.6	29,913	
Kalgoolie Enterprise	5.2	1,655	7	39.0	11,670	34.1	9,716	
Morning Star	1.3	874	7	9.6	7,010	10.1	10,559	
New Coolgardie	5.6	2,838	7	35.0	17,367	37.5	17,262	
North Kalgoolie	19.8	3,018	10	184.1	42,584	206.2	48,047	
Sons of Gwalia	10.3	2,565	10	84.0	19,323	88.4	20,217	
South Kalgoolie	7.2	1,533	7	56.3	11,621	61.9	12,051	

* Cu. yds. dredged.

SOUTHERN RHODESIAN GOLD

Company	October, 1954			Months since year end	Current Financial Year Total to date			Months since year end	Last Financial Year Total to date		
	Tons (000)	Yield (oz.)	Profit (£000)		Tons (000)	Yield (oz.)	Profit (£000)		Tons (000)	Yield (oz.)	Profit (£000)
Arcturus	3.1	1,038	3.3	4	11.8	3,713	12.7	12.3	—	12.0	
Cam & Motor	24.0	7,641	40.9	4	96.5	30,109	167.0	96.0	29,509	179.6	
Falcon Mines	17.5	3,207	25.6	1	17.5	3,207	5.6	16.0	2,588	6.0	
Globe & Phoenix	6.0	3,512	23.6	10	60.6	35,896	233.7	60.2	33,893	216.2	
Motapa Gold*	18.6	2,564	13.5	10	182.7	25,051	33.2	206.9	23,780	12.6	
Muriel Mine	3.1	791	10.2	4	12.5	3,732	40.5	6.6	—	28.2	
Rezende	6.2	995	1.0	10	64.9	10,798	15.1	65.5	11,583	17.1	
Tebekwe	6.5	1,014	1.2	4	30.1	4,077	5.1	32.6	—	10.3	

* Excluding premium gold sales.

† Including £360 being an adjustment on August output.

‡ Including £4,995 from accumulated concentrates, which were re-treated in the roasting unit, also £563 additional revenue in respect of gold during August.

L indicates a loss.

MISCELLANEOUS GOLD

Company	October, 1954			Months since year end	Current Financial Year Total to date			Months since year end	Last Financial Year Total to date		
	Tons (000)	Yield (oz.)	Profit (£000)		Tons (000)	Yield (oz.)	Profit (£000)		Tons (000)	Yield (oz.)	Profit (£000)
Br. Gu. Consol*	221.3	2,085	—	10	2,011.7	17,848	1984.4	12,384			
Clutha River*	220.0	557	—	7	1,474.0	2,404	1561.0	3,579			
Frontino	10.5	5,764	—	10	104.2	57,880	97.2	47,592			
Kentan (Geita)	22.3	3,452	—	4	88.3	13,676	90.5	13,546			
New Gu. Glfd.	3.5	1,346	—	1	3.5	1,346	3.0	1,490			
St. John d'El Rey	28.9	£140,000†	—	10	261.3	£1,203,501	273.1	£1,572,018			

* Cu. yds. dredged. † 4 weekly period since year end.

‡ Estimated realizable value.

INDIAN GOLD

Company	October, 1954			Months since year end	Current Financial Year Total to date			Months since year end	Last Financial Year Total to date		
	Tons (000)	Yield (oz.)	Profit (£000)		Tons (000)	Yield (oz.)	Profit (£000)		Tons (000)	Yield (oz.)	Profit (£000)
Champion Reef	15	5,913†	—	10	150	58,994	112	43,544			
Mysore	19	6,370	—	10	180	66,446	156	58,542			
Nundydroog*	18	4,918	—	10	212	60,079	209	57,880			
Ooregum	—	83‡	—	10	—	1,402	67	19,459			

* Includes tailings. † Includes 60 ozs. from clean up. ‡ Yield from clean up only.

TIN OUTPUTS IN TONS OF TIN CONCENTRATES

Company	Oct.	Month since year end	Financial Year to Date		Company	Oct.	Month since year end	Financial Year to Date	
			This	Last				This	Last
EASTERN					NIGERIA				
Ampat	140	10	10261	10454	Ex-Lands	50	10	483	509
Berjantai	644	6	3652	2833	Filani	41	10	384	56
Ipo Tin	41	7	3341	2472	Gold & Base	56	10	409	464
Kamunting	824	7	6466	766	Gold & Base†	211	10	122	763
Kinta K.	241	7	1691	173	Jantar	18	1	18	16
Kinta T.	351	10	2773	2824	Jantar†	18	1	18	18
Klang River	181	7	200	2943	Jos Tin	142	2	281	261
Kramat	501	7	1773	—	Kaduna P.	5	10	60	981
Kuala K.	2522	7	15221	11003	Kaduna S.	25	10	290	298
Kuchai	401	1	403	352	Keffi	11	7	72	252
Larut	1221	10	9942	4921	Keffi†	43	7	2551	781
Lower Perak	1372	6	9701	4841	Lond. Nig.	25	7	170	1672
Malaysiam	10	7	731	613	Naraguta Ex.	111	10	642	642
Pahang	220	3	660	660	Naraguta K.	173	10	1491	1361
Rahman H.	342	4	1402	1621	Naraguta T.	151	10	1673	198
Rantau	674	4	2422	2271	Naraguta T.†	10	10	69	50
Rawang Conc.	224	7	3111	450	Ribon c	121	7	671	80
Rawang Tin	56	7	3161	1491	Ribon† c	61	7	61	—
Renong	77	4	4041	2871	S. Bukuru	42	10	61	652
S. Kinta a	4061	7	2761	2585	Tinfields of Nig.	22	7	171	171
Siamese Tin	183	10	1581	1568	Tinfields of Nig.†	3	7	171	—
Taipung	48	10	5481	901	U. Tin c	194	4	551	35
Tambah	18	10	1961	901	U. Tin† c	142	4	141	1
Tanjong	601	10	6161	6652					
Tongkah	442	4	1761	144					
NIGERIA					MISC.				
Amal. Tin	375	7	2366	2298	Beralat Tin	2	7	31	57
Amal. Tin†	80	7	363	392	Beralat Tin†	175	7	1189	1330
Bisichi	82	10	530	421	Geevor	53	7	358	388
Bisichi†	38	10	238	159	Sth. Crofty Tin	481	10	4861	4531
					Sth. Crofty Tin†	12	10	81	13

† Quarterly

‡ Columbite

§ Wolfram

a Kinta No. 2 dredge resumed working on October 9, 1954, after completion of major repairs.

b September Figs.

c This figure includes the July-Sept. output from the new Odeji areas.

COAL OUTPUT

Company	October (in tons)	Months Since Year End	Cumulative Totals (in tons)	
			This year to date	Last year to date
Amal. Coll. of S.A.	574,980	10	5,748,480	6,281,991
Apex	80,488	10	804,323	798,695
Blesbok	41,178	10	441,343	521,628
Coalbrook	26,847	10	76,798	—
Coronation	84,344	10	861,110	896,171
Dundee	31,722	10	318,829	362,831
Natal Navigation	103,721	4	411,938	474,917
New Clydesdale	83,014	4	290,558	282,224
New Largo	88,316	10	811,391	471,087
S.A. Coal Est.	131,000	4	535,623	542,896
Springbok	66,960	10	661,871	715,564
Transvaal & Delagoa	127,730	2	250,781	251,768
Van Dyks Drift	67,000	10	513,142	474,743
Vierfontein	90,449	10	791,506	230,682
Vryheid Cor.	40,901	10	419,023	427,032
Vryheid Cor.*	36,255	10	352,889	363,140
Wankie Coll.	270,727	2	516,191	432,730
Wankie Coll.*	15,790	2	31,077	25,152
Witbank	138,265	10	1,320,051	1,330,570

* Coke

OIL OUTPUT

Company	October (in tons)	Months since Year End	Cumulative Totals (in tons)	
			This year to date	Last year to date
Anglo Ecuadorian	27,629	7	190,159	183,337
Apex Trinidad	37,504	1	37,504	37,329
Kern Oilfields	26,503	5	132,379	139,231
Kuwait Oil*	3,774,492	9	34,054,669	31,267,376
Lobitos Oil	43,006	10	414,448	387,051
Trinidad Central	8,728	10	88,036	81,033
Trinidad Leaseholds	81,320	4	320,516	301,250
Trinidad Petroleum	41,573	3	123,165	118,989
Ultramar Oil†	113,927	10	1,081,762	1,060,641
Quatar Petroleum*	374,154	9	3,428,888	—

Note—1 ton taken to equal seven barrels.

* September Figs.

† Output figures are for S.A.P. Las Mercedes in which Ultramar holds a 50 per cent interest.

GÉOMINES

The Annual General Meeting of the Compagnie Géologique et Minière des Ingénieurs Belges (Géomines) will be held on December 14 next. The following is a translation of extracts from the text of the directors' report which is being circulated to shareholders with the accounts for the year to June 30, 1954.

The fall in the market price of tin, which had been declining since April, 1953 (and of which you were informed in our last Annual Report), reached its lowest point at the beginning of the year under review. After remaining for some time in the region of £600 per English ton (Fr. 82,675 per metric ton), prices began to rise gradually, the average price for June being £725 (Fr. 99,900 per m.ton). Since then the price has steadied at a slightly higher level.

Thanks, however, to the price at which we negotiated sales contracts with the American authorities in 1952, the average price for which we were able to sell our tin output during the year under review was Frs. 110,000 per m.ton of metal, compared with Frs. 130,000 in the fiscal year 1952-53.

The sudden change to more favourable conditions on the tin market observed during these last few months is not unconnected with the conclusion of the International Tin Agreement, the ratification of which by the necessary majorities from both producer and consumer countries is now soon expected. When the Tin Agreement comes into force, its operation should have a direct influence on the tin market. Among other objectives, the Agreement seeks, in effect, to eliminate excessive price fluctuations and ensure equilibrium between supply and demand. To achieve this, the International Tin Committee has complete power, both in the fixing of ceiling and floor prices, between which the market price shall fluctuate, and in the control of exports and the operation of buffer stocks. The Agreement provides that initially the floor and ceiling prices should be respectively £640 and £880 per English ton (Fr. 88,190 and Frs. 121,260 per m.ton).

We can now only await the coming into force of the Agreement, and hope that it will lead to the restoration of the confidence and stability so essential to tin mining, not least in Central Africa, where the mining industry, in addition to raising the economic standards of under-developed countries, plays an important part in the social advancement of the indigenous population. In this connection it should be mentioned that in order to assist the Congolese tin industry, the government of the Colony recently lowered the export tax from 11 per cent to 7 per cent ad valorem.

PROSPECTING

(a) *Zone of altered pegmatites.* It may be recalled that the boring programme undertaken about 25 years ago established the presence of a reserve totalling 70,000 tons of cassiterite in the altered zone of the Manono-Kitotolo deposit. Since this assessment was made, 76,000 tons have already been extracted from this section. Our geologists estimate the remaining reserves of cassiterite at about 17,000 tons but the extraction of this ore will become increasingly difficult. During the year 1952-53, 64.5 per cent of the output came from these altered deposits. For the year 1953-54, the proportion dropped to 52.2 per cent, and it will henceforth tend to decrease progressively.

(b) *Zone of "stony" pegmatites.* Recent estimates put the tin ore reserves in the "stony" zone of our deposit (underlying the altered zone) at 70,000 tons of cassiterite, that is to say equal in importance to those contained in the altered zone.

During the fiscal year 1952-53, output from this section of our reserves was only 25 per cent, while for the year under review, it was over 40 per cent. Increasing output from this section will compensate for the progressive exhaustion of reserves in the altered zone. The working of these deposits will ease problems of mining and milling the hard rock deposits.

(c) *Zones of hard rock pegmatites.* More than 100,000 tons of cassiterite have already been proved in the zone of hard rock pegmatites, but the full extent of these reserves is certainly greater than this. Production from this zone accounted for 8.8 per cent of the total output in the year under review.

The presence of tantalite and columbite in association with the stanniferous ores has been established in each of the above deposits. In addition the hard pegmatite contains between 10 and 25 per cent of spodumene, the principal mineral of lithium. Our reserves of this mineral are quite considerable and their value should make an important contribution to the profitability of this section of the mine.

OUTPUT

Cassiterite and tin. The output of cassiterite during the year under review amounted to 3,861 m.tons compared with 3,940 m.tons in the previous year. The slight drop in tonnage

was due to its being necessary to close down the central hydro-electric station for the overhaul of plant, some of which had been in service for more than 20 years. Of the tonnage produced, 2,015 m.tons came from altered pegmatites and 1,846 m.tons from hard rock deposits.

Our smelter handled 3,922 m.tons of cassiterite during the year under review, of which 986 m.tons were on behalf of other producers.

Tantalite. 171 m.tons of tantalum-niobium concentrates were recovered during the year under review, compared with 140 m.tons in the previous year. The sale of these concentrates, at a satisfactory price, is assured by a contract which is in force till the end of 1956 for delivery c.i.f. New York.

Coal. During the year under review, the Greinerville Colliery produced 10,213 m.tons of coal, compared with 9,000 m.tons in the same period last year. During the last few months an increase in local consumption enabled us to raise the monthly output to 2,500 m.tons. At this rate of output our mining costs are covered, and coal can be extracted economically.

The problems of the chemical processing of our coal is still being studied by the Syndicat de la Lukugu.

Lithium. Laboratory tests on the process for producing lithium carbonate, for which we hold patents, have proved satisfactory. The introduction of this process and the testing of its profitability is being effected on a semi-works scale in Belgium. As a matter of urgency we are now studying the possibilities of the industrial production of lithium carbonate in Africa since, as pointed out above, the high market price of spodumene adds considerably to the value of our reserves of hard pegmatites.

HARTEBESTFONTEIN GOLD MINING COMPANY

The 5th annual meeting of Hartebeestfontein Gold Mining Company, Limited was held on November 30 in Johannesburg.

The following are the highlights from the chairman's speech.

With regard to operations at your company's mine a total of 12,294 ft. of development has been accomplished from the commencement of development operations in August this year up till yesterday morning of which 9,405 ft. were at the No. 1 shaft and 2,889 ft. at the No. 2 shaft. Of footage advanced, 1,513 ft. were on the Vaal Reef all at No. 1 shaft and 1,400 ft. were sampled, showing 1,400 ft. equal to 100 per cent as payable having an average value 53.43 dwt. over a channel width of 13.7 in.

These sampling results were obtained in fifteen development ends advanced from the fifth and sixth levels and cover an area of approximately 500 ft. on strike and 1,150 ft. on dip of reef. Reef horizon in this area has been found to have been severely disturbed by faulting, but it is anticipated that it will be possible to mine in this area at a stopping width of the order of 40 in.

Good progress has been made with the transfer level, statutory connection between shafts, and by yesterday 1,038 ft. had been accomplished from the No. 1 shaft and 895 ft. from the No. 2 shaft, leaving 5,379 ft. still to be completed to effect a connection. It is estimated that holing will be made during March 1955.

HARMONY GOLD MINING COMPANY LIMITED

(Incorporated in the Union of South Africa.)

NOTICE TO HOLDERS OF 6 PER CENT REGISTERED UNSECURED CONVERTIBLE NOTES

NOTICE IS HEREBY GIVEN that the Register of Noteholders will be closed from December 11 to 31, 1954, both days inclusive, and that cheques in payment of interest at the rate of 6 per cent per annum for the period July 1, 1954, to December 31, 1954, will be posted to registered Noteholders on or about December 31, 1954.

By Order of the Board,
A. MOIR & Co.,

London Secretaries.

Office of the London Secretaries:

4 London Wall Buildings,
London, E.C.2.

November 29, 1954.

Mining Men and Matters

Messrs. H. C. Koch, G. W. H. Rely and Jack Scott have been appointed directors of Free State Geduld Mines.

Mr. H. E. Snow, who was one of the three-man Consortium delegation which negotiated the Oil Agreement with Iran, has resigned from the board of Anglo-Iranian Oil Company, Ltd., on taking up the appointment of general manager of Iranian Oil Participants Ltd.

Mr. K. Prabhakar, the well-known Madras metals and ore broker, is now in London and is staying at the Princes Court Hotel, Kensington, W.8. Telephone: Western 4886. Mr. Prabhakar is leaving on Monday for West Africa.

Australia House makes airborne scintillometer maps available for inspection. Airborne Scintillometer maps, prepared by the Bureau of Mineral Resources, Geology and Geophysics, can be inspected at Australia House on application to the Senior Representative, The Department of National Development.

The maps available include areas at Broken Hill, N.S.W., at Burnside and at Ban Ban in the Northern Territory. The maps show uranium anomalies in considerable detail.

Institute of Metals—Election of Members. The Institute of Metals has announced that an election of members of the Institute of Metals will take place on Friday, December 17, and applications for membership received by first post on that day will be submitted to the Council. Particulars of membership, application forms for membership and specimen copies of the Institute's *Journal* may be obtained on request from Lieut. Col. S. C. Guilan, the Secretary, The Institute of Metals, 4 Grosvenor Gardens, London, S.W.1.

Lodge-Cottrell £600,000 Order. Lodge-Cottrell, of Birmingham, has announced that it has secured an Indian contract valued at over £600,000 for electrostatic gas-cleaning plant for new furnaces at the Indian Iron and Steel Company's works in Bengal. The contract was secured in the face of competition from the United States and Germany.

Mine Safety Appliances Company Ltd., Queenslie Industrial Estate, Glasgow, and **Thomas A. Edison Ltd.,** London, have jointly announced that the former company have purchased from Thomas A. Edison Limited the miners' cap lamp manufacturing facilities situated in Glasgow adjacent to their present plant.

Under a licensing agreement made between the two companies, Mine Safety Appliances Company Limited, heretofore distributors of Edison Cap Lamps in world markets other than the Western Hemisphere, will now also produce the Edison Lamps for these markets, in Britain. Other interests and operations of Thomas A. Edison Limited in Britain will not be affected by this change.

AGENCE MINIERE ET MARITIME S A

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GOLD COAST GOVERNMENT

VACANCY FOR DIAMOND DRILLER GEOLOGICAL SURVEY DEPARTMENT

Applications are invited for one vacancy in the post of Diamond Driller Geological Survey Department.

Duties: To prospect mineral deposits, underground water supplies, foundations, etc., by diamond core drilling where the Director of Geological Survey may direct.

Qualifications: Candidates must have had at least 6 years responsible experience of diamond core drilling in connection with mineral deposit investigations in a wide variety of geological formations and must be capable of carrying out field repairs to the drilling plant and have sound mechanical and engineering knowledge and experience. He must be capable of keeping accurate drilling records.

Terms of Service: This post is a "Development Post" for implementation of specific projects under the Gold Coast Development Plan. The appointment will be on contract/gratuity terms for one tour of 18 to 24 months with a possible extension to two tours. Salary will be in the range £1,330 × £50—£1,680 per annum (consolidated) according to age, qualifications and experience. A gratuity at the rate of £37 10s. for each completed three months of satisfactory service will be payable on final termination of the contract.

Free passages on first appointment and on leave will be provided for the officer and his wife once each way during each tour of service. Officers will normally be required to travel by air. Free air passages will also be provided for a maximum of three children under 13 years of age.

Vacation leave with pay: seven days for each month of service. Free medical and dental attention provided for officer and family. Furnished quarters available at low rental. Income tax at local rates. Kit allowance on first appointment £30-£60 according to salary, provided no recent tropical experience.

Apply to the Adviser on Recruitment, Gold Coast Office, Melbourne House, Aldwych, London, W.C.2, giving full details of experience and previous employments.

HER MAJESTY'S OVERSEA CIVIL SERVICE

A vacancy exists for a Mining Engineer, Labour Department, Hong Kong. Age limits 25-35 years.

Qualifications: A University degree or Diploma of a recognized School of Mines in metalliferous mining; at least three years post graduate professional experience.

Duties: Organization and control of mining activities under direction of Superintendent of Mines; collection of revenue; general duties in connection with the operation of its sub-department.

Terms of Appointment: On probation to pensionable establishment with salary in the scale of \$1,050-\$1,875 per month (approximately £787-£1,406 per annum) plus pensionable Overseas Pay of between approximately £210-£280 per annum. Candidate appointed will be required to pass the first and second Cantonese Examinations before confirmation to the pensionable establishment. A temporary non-pensionable cost of living allowance is also payable. Free passages once each way each tour for officer, wife and children. Leave at rate of one day for each seven days of resident service. Quarters at rental of not exceeding one-eighth of basic salary. Income tax at low local rates.

Apply in writing to the Director of Recruitment, Colonial Office, Great Smith Street, London, S.W.1., giving briefly age, qualifications and experience. Mention the reference number BCD.132/51/01.

WANTED FOR JAMAICA. Qualified Mining Engineer, aged 27 to 34, for expanding Canadian bauxite operation. Three-year tour which could become permanent. Home leave passage paid three months every three years for man and family. Salary according to age and experience, but not less than £1,300. Apply Box 561, The Mining Journal Ltd., 15 Wilson Street, E.C.2. for interview in London.

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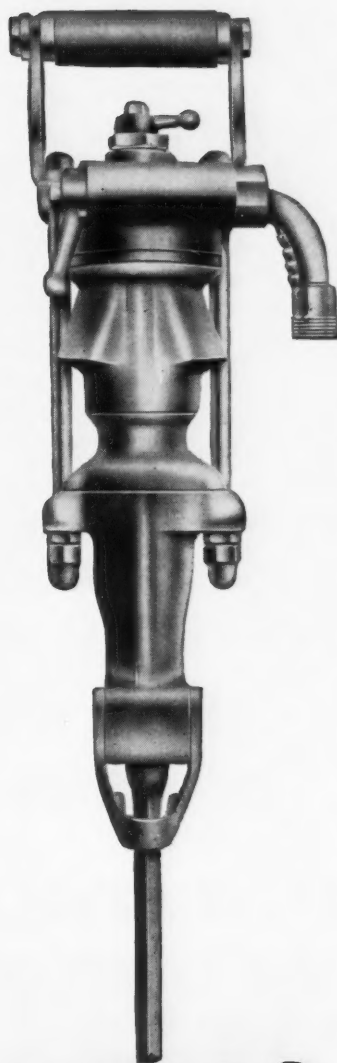
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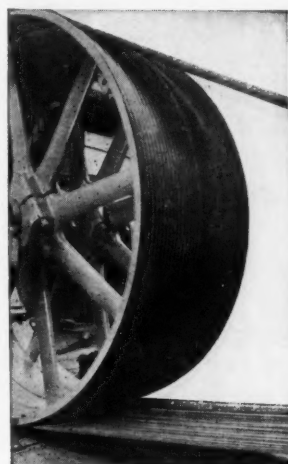
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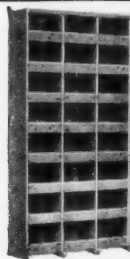


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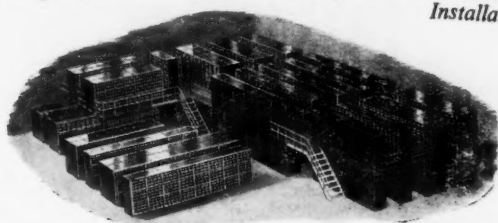
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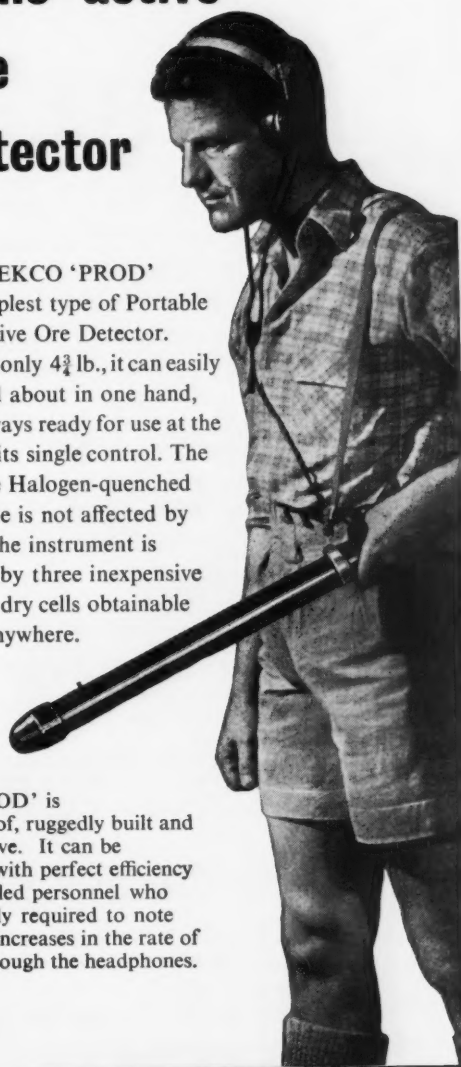
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